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VIEWS, NEWS AND INTERVIEWS.

Siemens & Halske, of Berlin, Germany, have obtained a concession to exploit the waterfalls of San Simon, at Tenancingo, for the purpose of producing electrical power in the City of Mexico. The power will be transmitted thirty miles.

A newspaper dispatch says that difficulty has been experienced on the Union Pacific telegraph system in working the wires between Weber and Peterson, Utah. The point is in Weber Canyon, about 15 miles from Ogden, and covers about 10 miles of wires. From accounts which have reached Superintendent Korty it appears that on the night of January 1 a heavy deposit of what has since been found to be salt fell upon the cross-arms of the telegraph poles and the wires. Since January 1 it has been found impossible to use the wires between about 10 A. M. and 10 P. M. Men were sent out along the line to knock off the deposit, but on the following day the wires were found in the same condition. Torches have also been tried, but without effect. Recently Superintendent Korty instructed his men to take an engine out of Ogden loaded with water and to play with a hose upon the poles and wires. The only explanation that Mr. Korty can give for the phenomenon is that the salt is raised from Salt Lake, 40 miles west, in the form of a mist and is carried east, where it condenses on the wires.

The *Cosmopolitan Magazine* has offered prizes amounting to $3,000 for horseless carriages making the best records and showing the most good qualities in a trip between its New York city office and its publishing plant at Irvington-on-Hudson.

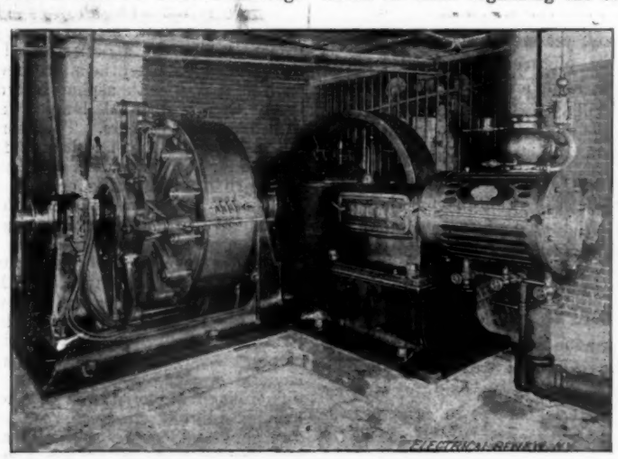
Mr. Wilkie, a watchmaker in Glasgow, Scotland, recently won a novel suit brought against him by the National Telephone Company. Mr. Wilkie is quite deaf, and when the company's canvasser made a telephone contract with him it was explained that the instrument was for Mr. Wilkie's personal use. Finally the company sued him for the rental of his telephone, but the court held that it was an implied condition of the contract that the wire and instrument should be fit and serviceable for the defendant's special case, and that the company had failed to make it so in spite of repeated complaints by him. It therefore gave a verdict for the defendant and granted him expenses.

It is reported that the "Electrobat," Morris & Salom's electric carriage which won the gold medal in the Chicago *Times-Herald's* motocycle race, has been sold by the Electric Storage Battery Company, of Philadelphia, for immediate shipment to Europe. It has been purchased by one of the largest electrical concerns in Europe. It is expected that by next Spring the company will be manufacturing the carriages largely for this country.

Chancellor Sneed rendered a decision at Memphis, Tenn., on January 14, holding telegraphic messages to be privileged communications. Telegrams sent to and by A. K. Ward, accused of forgery to the extent of over $200,000, were wanted in the proceedings against him; hence the decision.

A dispatch from Cape Town, South Africa, states that after nightfall on the day of the battle between Dr. Jameson and his followers and the Boers the latter used searchlights, themselves remaining under cover and relying upon their sharpshooters to pick off Jameson's men.

The legal affairs of the North American Phonograph Company appear to have been at last settled to a large extent. Vice-Chancellor Emery, at Newark, N. J., last week issued an order legalizing the compromise asked for by Edison and the stockholders and creditors. The note held by Edison for $65,000 against the North American Phonograph Company, amounting with interest to $75,000, is allowed. The receiver gets all the patents of Edison in the company named and in the Edison Phonograph Company, and prevents Edison from making phonographs for any one except the receiver. The decision is favorable to the receiver.



DIRECT-CONNECTED ENGINE AND DYNAMO IN THE "TIMES" BUILDING ELECTRIC LIGHTING PLANT, NEW YORK CITY.

It is reported that of 17 brokers' wires to Chicago the Western Union Telegraph Company leases only two, and out of 46 wires in the New England States it collects rentals on only 17. It is also said that the Western Union and Postal companies are having a disagreement over rates for press messages for the ensuing year.

ELECTRICITY IN A MODERN OFFICE BUILDING.

BY D. H. GILDERSLEEVE, M. E.

One of the problems of the day time and again brought to the attention of engineers is the question how to increase the facilities of the office building built, say, half a decade or more ago, so as to enable it to compete successfully with the newer buildings constantly being constructed.

Some years since it was the practice of the architects to design the lighting, heating and power plants of the various buildings which they had under their supervision, working through subordinate engineers in their employ. The question is of such importance as to call for the best engineering talent, and the engineer in charge should be responsible to the owners direct and be limited only by the design of the building as prepared by the architect. And even in the design of the building it is necessary for the engineer to be consulted as an equal with the architect in order to settle the size of flues and their location, the size and location of shafts, both elevator and air, and also the location of all the machinery required for light, heat and power, for on the proper selection, design and location of the above depend the comfort of the tenants and the size of the operating expense account, the two most important factors in the maintenance of an office building.

It has been said that the heart of an office building is located under ground.

Taking this view of the matter, one can readily see that it is necessary time and again to overhaul the power plants constructed some years ago in order to bring them on an equality with those of the present day, even allowing for the improvement in machinery, as the demand for light, heat and power in nearly every large building constructed over ten years back was inadequately provided for in accordance with the demand of today.

That this fact is self-evident is clearly proved by an instance which I have in mind at present. The

Times newspaper building in Printing House Square, New York city, which was completed in 1889, and at that time considered one of the finest office buildings in the United States, has, in order to maintain its enviable reputation as giving the best service in the neighborhood in which it is located, been required within the last two years to put in larger and more efficient pumps, thereby duplicating the pumping plant and giving better elevator service throughout the building, and it has also been found necessary to increase the size of its electric plant, owing to the extra demand for light, which in every office building has been found to be a constantly growing factor, of which every landlord complains and none have been able to cut down. The *Times* Building, being open day and night all the year round, offers special advantages to tenants and peculiar difficulties to engineers, as all improvements have to be made at odd times in order that the constant running of the building may not be interfered with in any way. The illustration herewith represents work that has been done with the building kept up to its full standard of service constantly while the additions were being made. The elevator plant, which was put in some two years ago, represents work done under similar conditions, the tenants at no time night or day being deprived of the use of the elevators or any other of the usual facilities.

A brief description of the new electric lighting plant is as follows:

A 14x15 "Ideal" engine is direct connected to a 100-kilowatt Siemens & Halske dynamo, the engine run at 230 revolutions with 80 pounds of steam and the dynamo wound for 125 volts, furnishing a normal capacity of sixteen hundred 16 candle-power lights, and being capable of working up to 2,000 lights, if necessary, without strain. The dynamo is connected to the risers in the building by means of 1,000,000 circular mils "Safety" insulated wire cable, the wires from there through the building being extra large. The switchboard is of marbleized slate, with illuminated Weston instruments, rheostat and double-throw switch, enabling the operator to throw in the old plant or new plant at will. This last addition makes a duplication of all machinery in the *Times* Building, and will enable the owners to give the best possible lighting service to their tenants. It must be remembered that this building has to-day the best natural light, having three sides open to light and air, and I believe it has, with the new plant, the best artificial light in the neighborhood, as the chances of a failure in the lighting are minimized to the lowest degree and the power is ample for all requirements.

The owners have recognized their surplus of power by a marked improvement on the lighting of their main hall, the white and gold effect in their corridor being considerably enhanced by new fixtures furnished by the Oxley & Enos Manufacturing Company. With the new and artistic style of fixtures constantly coming on the market, and with lamps made in all conceivable shapes, sizes and candle-power, the lighting of a building is becoming one of its most important and decorative features, and the necessity of having an ample supply of power therefor to meet present and future requirements can hardly be overestimated.

It might be well before closing to mention the fact that when the old electrical plant was put in the *Times* Building, some seven years ago, it was considered at that time to have been selected according to the best engineering practice of the day. That this supposition has proven to be a fact is clearly demonstrated by the results obtained. Two 60 horse-power Straight Line engines, and two 550-light United States dynamos (belt driven) have furnished all the light for the building night and day, with no let up during this period, and are still giving entire satisfaction for their class of machinery. It would be a pleasure to me to show any consulting engineer our entire plant in operation or its working plans.

THE UPBUILDING OF THE SMALL TOWN.

READ BEFORE THE NORTHWESTERN ELECTRICAL ASSOCIATION, MILWAUKEE, WIS., JANUARY 15-17, 1896, BY FRED DE LAND.

Though we may not agree with the pessimistic side of the question Mr. Fletcher so ably presented in "The Doom of the Small Town," in the *Forum*, yet we must admit that he clearly pictured the silent tragedy that is being enacted in many towns and villages whence the young, the hopeful, the more ambitious, depart to seek more suitable abiding-places, leaving the dullard, the ne'er-do-well, the rich-in-purse-but-poverty-struck-in-soul, to rust on in unhelpful existence. And while citing many causes that may have led to present conditions, his conclusions, that "Whatever be the causes, unless tendencies be arrested, the future of the small town is extremely discouraging, and it is very doubtful whether any material change in existing conditions will soon occur," is not nearly correct.

But the question I propounded to myself while reading this article was: Has Mr. Fletcher shown us only one side of the shield, and that the dark side? Is it not possible to gather statistics relating to small towns that would have shown a condition of prosperity in many, even though such a showing would rob the first portion of his paper of much of its gloom? For there is nothing new in villages being deserted for towns more favorably located or offering greater advantages to the inhabitants. Such movements in our country can be traced as far back as A. D. 1700.

The reverse side of the shield shows that never before have so many small towns enjoyed modern improvements, that not only tend to make life better worth the living, but also to increase property values out of all proportion to original investment. In the very States he mentions are towns of only 600, 800 and 1,000 inhabitants with electric-lighted streets, with well-kept roadways and surrounded by that atmosphere of prosperity that attracts and invites the refined, the practical and the prosperous. In Michigan there are 71 incorporated cities, varying in population from 237,837 (Detroit) to 746 (Gladwin), and in every city there are one or more electric lighting plants, which is not at all strange. But there are also 309 incorporated villages, reporting a population in 1894 varying from 91 to 6,051. Of these 309 villages nearly 100 have electric-lighted streets, though several reported a population considerably less than 1,000 souls. Compared with the census of 1890, the census of 1894 records a decrease in population in several towns and villages, but in no town of electric-lighted streets was any decrease reported, while the growth in some of these electric-lighted towns is almost marvelous. Speaking to a Michigan merchant on this subject, he replied that in his town, of nearly 3,500 inhabitants, the marked growth in population and in prosperity had its inception in the order of the Village Board directing that electric lights be employed in illuminating the streets at night. "Now, the hanging of those big lamps in our streets has indirectly wrought as marvellous a change as often follows the placing of a new and attractive carpet in the reception room of the old homestead. Gradually the old-style furniture is replaced by the modern and more attractive, until finally the room is modernized throughout, is artistic and comfortable. So it was in our town. The arc lights gave us a taste of progressiveness and awoke a desire for other improvements. Later the main streets were all paved with asphalt or with brick and additional lamps were placed at street corners. Then some old frame stores that had been a fire menace for years were torn down and a modern office building erected on the site. These improvements furnished our local editor with a subject to talk about, and soon the fame of our house-cleaning had penetrated every hamlet in the State. That this fame brought its own reward is shown in the fact that we now have no less than seven factories, one of which employs 180 hands, and five large modern stores, to say nothing of numerous small shops; two new school houses, three churches, while 583 new dwellings and other buildings have been erected since the arc lamps were placed in circuit; and when I consider how remarkable are the changes that have been wrought, and how we might still be jogging along in the old way had the dozen oil lamps not been displaced by the big white lights, I feel very grateful for the wisdom and the forethought that ordered the expenditure that proved to be so profitable an outlay."

This is a homely illustration, but thoroughly sensible and practical, and one that many a village resident might profitably ponder.

From another town comes this story: "Our village was always blessed with natural advantages far superior to those possessed by neighboring towns, but we lacked that impulse so essential in starting any good movement. Following the building of a railroad through our town, much business of a certain kind was transacted, but there was no healthy growth. The construction forces passed on, the undesirable characters that always flock along the line of a new railway flitted to greener pastures and the town resumed its normal dullness. Thirty miles away a village having progressive merchants, who tactfully sought the trade of outlying districts, rapidly increased in population and in wealth; and there our own townspeople would go and make all but the smaller purchases. So our business houses decreased in number till we had but one dry goods store, a few shops, three groceries, a saloon or two and three churches, while the weather-stained fronts of buildings, large and small, told in plainer terms than any language could express that ours was a town of gray-haired toilers eking out only a semi-decent existence, and longing for the days to come when their children should be safely settled in one of the larger cities.

"And then came the crisis. A shrewd old man of wide experience and broad views, searching for the right climate where his last days could be passed free from the pain and distress of a periodical ailment, made his home in our town. Energetic, full of resources, tactful, he gradually won the good-will of the village authorities and secured a franchise for an electric lighting plant and an order for six street lamps for a long term of years. Now, six arc lamps are a very small number; yet, as they were all hung within sight of the depot, 30 days had not passed ere it appeared as if all the world had learned of our progressiveness and had come to visit us. And with this influx of visitors came the desire to spruce up our belongings. Houses dingy from neglect were washed and repainted, lawns were placed in order, trees were trimmed, sidewalks repaired. And as the smallest happening in a village is duly chronicled and commented on, soon it was heralded throughout the State that an abundant prosperity was being showered upon our town. And then the prosperity actually came. Quickly others came to enjoy the overflowing riches that rumor accredited to us, and since that time we have experienced a regular healthy growth, while our young people are brought in contact with and are in position to enjoy every advantage afforded the children in any but the very largest of cities. Now the streets are paved, parks abound, school-houses contain every modern convenience, taxes are low, there is no debt and the average value of real estate is five times what it was seven years ago."

Surely it is more pleasant to read instances of this character than it is the despondent conclusions Mr. Fletcher has presented in the *Forum*. And it requires no vivid stretch of the imagination to conclude that just as satisfactory experiences might have been recorded in some of the Massachusetts towns that report such a marked decrease in population during the past 10 years. The State Census Report, just issued, shows a loss in the 10 years intervening between 1885 and 1895 in 140 towns and villages. The streets of some of these villages and towns have never been lighted with electric lamps, and the decrease in population reported in each ranges from 5 per cent to 25 per cent, while, on the contrary, many other villages have advanced rapidly in population; Millis, for instance, from 683 to 1,006, or an increase of 47 per cent from the day that modern, progressive methods predominated. Millis, it is needless to state, is a town of electric-lighted streets. Then there is Dudley with a gain of 17 per cent in population, and a dozen other electric-lighted villages, all showing marked gains, while their neighbors, puttering along with dark streets, had slowly degenerated.

NORTHWESTERN ELECTRICAL ASSOCIATION.

REPORT OF THE FOURTH ANNUAL CONVENTION, HELD IN THE CLUB ROOM OF THE HOTEL PFISTER, MILWAUKEE, WIS., JANUARY 15, 16 AND 17, 1896.

President George Grimm, in call the convention to order at 11 A. M. on Wednesday, January 15, said: "Gentlemen, I have delayed this long in calling the convention to order to enable those of our members who could not arrive here on the early trains to be at the opening session. You will consider the convention opened and ready for business. As our secretary, Mr. William Goltz, is still absent in Europe, it will be necessary that you elect a temporary secretary." Mr. Cole nominated Mr. A. C. Bunce, and the motion was seconded and carried.

As the minutes of the previous meeting had been printed and distributed to the members, the reading of the minutes was dispensed with, and stood approved as published. The address of the president was then read as follows:

GENTLEMEN: Instead of delivering the customary address, dealing with subjects of interest in the electrical field, I take the liberty to present for your consideration some thoughts relating to the welfare of our association. This association is composed of an extraordinary class of men—extraordinary even in an age when every phase of commercial and intellectual life produces men of pre-eminent ability and energy. It is indisputable that those representing the electrical business and progress of the age stand in the front rank of intellectual ability, courage and business daring. But I will stop right here lest a feeling of pride and self-satisfaction take possession of you, which would militate against the object of my remarks. The fact is, I have a grievance to which I desire to lend words, which, however, to be generous to you, I do not desire to have printed in the records of our association. This grievance is the more emphasized by reason of the fact that since my membership I have received many benefits in the nature of knowledge and experience, and have seen the grand possibility of far greater accomplishments than we have yet obtained. Since assuming the duties devolving upon me as your president, and owing to the fact of the absence of our secretary for a considerable period of time, I have become exceedingly familiar with the "business end" of this association; and I marvel that a body of men handling, controlling and commanding an enterprise requiring such consummate skill and ability and such masterful tact in dealing with the prejudices of public opinion should base the fabric of its association upon a foundation so utterly unstable and insufficient. Think of it. Without having incurred any extraordinary expense, each succeeding report of our secretary shows a deficit in the treasury which no juggling with figures is able to conceal, and it is only by the strongest efforts of the secretary and president combined that it is possible to raise sufficient funds from generous-hearted advertisers to pay the expense of publishing the proceedings of our conventions. It is apparent that a radical change must be inaugurated; either the annual dues must be increased, and prompt payment insisted upon, or other provisions must be made. If for a few minutes you would bring that skill that has made your individual business a success to bear upon this problem, I believe a plan could be devised that would place us upon a basis consistent with the dignity of the membership. The necessity is urgent, and I commend the subject to your prompt consideration. Let me call your attention to another matter. You should at once distinctly define the extent to which this association will go and to which its officers and committees are authorized to act in furthering proper legislation relating to the electrical interests and incurring expense therefor. During the short period that I have held this office I have been solicited by various parties from several States to give information and lend assistance in overcoming attempted adverse legislation, furthering proper legislation, and similar matters. It has been my invariable rule to reply that the scope of my powers did not permit me to take any hand in the matter, and that the object of our association was not to interfere in legislation except so far as the knowledge gained by the members and their influence as individuals would aid in that direction. Whether I was right or wrong in this construction, it is desirable that you define clearly the position of the association for the guidance of your future officers. Personally I do not believe it practicable for us to take hand in shaping legislation except as in the manner indicated; our lack of funds for defraying expenses and the extent of the territory our association covers seem conclusively to forbid this. But we could with little or no expense do most material good to the electrical interests and aid in bringing about laws just in themselves and adapted to the wants of the times. We could draft and propose laws that would take the place of the feverish abortions of justice presented at almost every session of the legislatures, which would receive the support of right-minded citizens, and we could, as in this State, completely answer all adverse arguments by ourselves, proposing to meet the public demands by just laws and in an honorable manner. By drafting a uniform system in that line, to be submitted to the legislatures of the different States, by the individual members of the association, however, and not by the association as a body, we would disarm opposition and accomplish untold good for the electrical interests without incurring any expense. There are other matters calling for attention on your part; the rules of wiring, etc., adopted by various boards of underwriters are frequently oppressive and impracticable in many details. The safest body of men to draft these rules are practical electricians, and a thorough system embodying the best experience of both underwriters and electricians would be safer and less oppressive than any we now have. I think these remarks will suffice for this time. We do not want to undertake too much at once, but whatever you may determine in regard to the work we should accomplish. Do not let this convention adjourn without having devised some means of putting us upon a good financial basis.

The secretary's report showed that the membership of the association had grown from 88 a year ago to 140 at present. Three members died, 12 moved away from the territory of the association and resigned and 52 new members came in.

Treasurer Schuette made no report, but spoke as follows:

I am behind to the tune of $80 I took out of my own pocket. Now, I would suggest that my successor, instead of giving a bond, should ask a bond from the association for funds he may advance. Now, besides this $80 I have also paid out of my own pocket, which, of course, I don't expect to give the association, about $300 for legislation. As our chairman says, it is important that the association have a fund to cover expenses at Madison when the legislature is in session, for there is no telling when bills will be introduced that are very detrimental to our station owners. Therefore I would suggest that our membership dues be increased from five to ten dollars.

Mr. Debell: I would like to make a motion that, inasmuch as there are quite a large number of members not here whom we expect will be here, and it is desirable to have as many as possible here when the officers are elected, I move that the election of officers be deferred until the close of the afternoon session, if that is agreeable to the members; or, if any better time is suggested, I will agree to that. I would give as an hour 4 o'clock this afternoon. Motion seconded and carried.

At the suggestion of the chairman, applications for membership were considered. Four active and two associate members were elected.

The transportation committee reported that the railroads had granted a round-trip fare of a fare and a third to and and from the convention, provided 100 members attended.

Mr. Lord stated that the committee on legislation, of which he had been appointed chairman, made its report at the semi-annual meeting of the association in Chicago, and there was nothing further to report.

The entertainment committee made its report, which included invitations to visit manufacturing establishments, electric stations and other places of interest in Milwaukee.

Mr. De Land, as chairman of the committee on programme, reported that Mr. A. V. Abbott had been called to Columbus, Ohio, on important engineering work, and that Mr. Summers had kindly consented to give a blackboard talk on "Economy in Small Stations," to take the place in the programme of Mr. Abbott's paper.

Under the order of miscellaneous business Mr. Mercein spoke as follows:

With an interesting remembrance of the president's address and its suggestions, I have hastily looked over the board of directors of this corporation with the view of ascertaining whether or not it would be advisable to appoint a new committee, say, of ways and means or to vest that power and instructions in the board of directors, to provide proper remedies for the evils justly complained of in your address. It has been suggested that perhaps the directors might have that power added to them, or such instructions given to them as to suggest a remedy for those evils. I would like the matter discussed, if the members are taking an interest in it—as they should do—to in some way cover the ground as suggested in the president's address. My first impression was that a new committee—a standing committee of ways and means—be appointed, with a membership either from the board of directors or from the membership at large, as seems best, to take up this question. Assuming the truth of the statements in the president's report, it is a matter which interests us all. I have no motion to make, but simply make this as a suggestion, open to discussion, of the best ways and means to accomplish the object necessary to be obtained.

Mr. Copeland: Mr. President, under this head I would like to call attention to one matter that is probably in the minutes of the last meeting, and when Mr. Debell made a motion to approve it I didn't go either way, being not quite certain on one point. You were present at the Chicago meeting, I believe. Did you notice that I was there or not? Did you notice whether or not I was intoxicated?

The Chairman: Didn't you have a fire at that time?

Mr. Copeland: Yes, but previous to that time? In regard to printing the minutes, I think there should be a little more care taken. I am reported as saying, on page 32 of the minutes: "I put in three 66 by 18 engines." Now, will somebody describe that kind of an engine?

Mr. Mercein: Apropos of that, I also have a small complaint to make. On page 75 I made use of the expression that a person was in the "throes of composition," and am quoted as "throws" of composition. This would indicate that I did not have a proper command of the English language.

Further discussion of errors in the printed report of the association's proceedings ensued.

Going back to the matter brought up by Mr. Mercein, the chairman, after some discussion, was instructed to appoint a committee of three, from the active membership, as a ways and means committee of the association. The chairman stated that he would announce the committee later and suggested that resolutions be presented defining the committee's powers. After further discussion on unimportant matters the session adjourned until 2 P. M.

At the afternoon session the following officers for the ensuing year were elected:

President, Pliny Norcross, Janesville; first vice-president, Charles D. Wyman, Milwaukee; second vice-president, H. C. Higgins, Marinette; secretary, Thomas R. Mercein, Milwaukee; treasurer, John Schuette, Manitowoc. Mr. Mercein succeeds William Goltz, who is in Europe.

Two papers were read during the afternoon session. W. J. Buckley, of the Fort Wayne Electric Corporation, read a paper on "Modern Apparatus vs. Existing Conditions," the first portion of which appears on page 46 of this issue of the ELECTRICAL REVIEW.

A paper by Arthur Vaughn Abbott on "Economic Expression for Fuel Value" was announced on the programme, but not read, and Fred De Land followed with a short and interesting paper on "The Upbuilding of the Small Town," published on page 44 of this issue.

The remaining sessions of the meeting were devoted to the reading of papers and their discussion.

The banquet was served on Thursday evening in the banquet hall of the Hotel Pfister. This was a most enjoyable and largely attended function.

The Chicago delegation made the trip to Milwaukee in the special chair car "Racine," which was attached to the fast train leaving the Wells street station of the Chicago & Northwestern Railway at 8.30 Wednesday morning. The feature of the trip was the spirited preliminary discussion of Mr. M. J. Buckley's live paper "Modern Apparatus *vs.* Existing Conditions." By previous arrangement several of the makers of lamps and transformers had representatives present to debate the accuracy of certain statements made, and the outcome of the discussion was a better mutual understanding of the questions involved than could have been secured in any other way.

MODERN APPARATUS vs. EXISTING CONDITIONS.

READ BEFORE THE NORTHWESTERN ELECTRICAL ASSOCIATION, MILWAUKEE, WIS., JANUARY 15–17, 1896, BY W. J. BUCKLEY.

In compliance with the kind invitation of your committee, I have the honor to say a few words to this association, which I hope will not be taken as the remarks of one wise in his generation, but simply as opinions suggested by and limited to my experience in the operation of lighting plants.

Two things are constantly changing the conditions of your various plants, namely, the development of new apparatus and the reduction in price of supplies.

The money-earning station fits its apparatus to its service; not the service to the apparatus. If you charge $10 a month for a 2,000 candle-power arc lamp and your customer regards you as a robber, it would seem expedient to furnish either a smaller arc or a big incandescent lamp service at meter rates, thus reducing the price, but not the proportionate profit.

A big cut in your 2,000 candle-power rates will transform that service into a non-paying investment, while a service of half the candle-power at half the cost of production will pay a profit.

The big incandescent lamp is a money-making factor ignored by a majority of operating stations, either through lack of knowledge or appreciation of the fact that efficient 100 to 500 candle-power lamps are selling at a price that commends their use.

Unless you are running a modern plant, it costs $6 a month to produce and maintain a 2,000 candle-power arc lamp. This applies to the average station, and will be believed by the stockholder who has been in business long enough to see his intended investment enlarged, his plant rebuilt and his prospective profits used up, long before they reach him in the form of a cash return, in expenditures necessary to meet unlooked-for changes or unwelcome competition. One of the chief elements of the latter is the Welsbach burner. This competition you have met in your various ways; yet you are all doubtless impressed with the fact that it has come to stay; not perhaps in its present form, but in a new and improved burner which eliminates some of the many glaring faults of the original. The quicker this competition is met, the easier and cheaper it is overcome.

But how?

Many men of many minds would have as many answers.

The president of the Calumet Gas Company, of Chicago, operating the second largest arc plant in this country, thinks the strongest competing service is an arc system in "blocks of five." Five hundred candle-power arc lamps, five-sixteenth carbons, $5 per month, five per cent discount when paid within five days after the first of the month.

In this consideration we may assume, first, it is unnecessary to bodily buy the gas company; or, secondly, sell your holdings at a sacrifice. If you can sell at a price and will not, we take it that you are running your station for the sake of your health, in which event the Welsbach burner becomes a mere diversion, breaking the monotony of an otherwise peaceful life.

The Welsbach fad strikes a town over night and goes through it like a dose of measles. It lasts about nine months; will usually displace one-third of your lamps in service, which, owing to the many objections of the burner, developed in its use, gradually return like lost sheep to the fold until the former output is reached, if not passed, by the demand created for a more liberal illumination. * * * *

The first change found necessary in your operation is to increase the candle-power of your lamps to a competitive brilliancy. When 16 candle-power lamps sold at 85 cents this might prove disastrous, but with better lamps at 18 cents apiece it becomes a necessary virtue. This will not decrease your profits as much as your first thought might suggest, for the increased voltage will run your meters fast enough to make up the added expense, provided you sell your current through meters. If you do not do so, the added revenues of those who do would suggest that you climb in the band wagon and buy meters for your entire equipment. It is a money-earning proposition to you and a satisfaction to your customer, who is pleased with his daily inspection of current used, even if the meter is 25 per cent too busy.

In this connection the advisability of accurate switchboard instruments and their periodical calibration with a standardized instrument is clearly shown, as a comparison of the station output with the receipts will immediately uncover any leakage in the revenue.

The increasing of your pressure will disclose, if your experience has not already proved it, the inefficiency of small transformers of any make. The ground losses on the line and the copper and iron losses in the transformers of the ordinary alternating station are uselessly and unnecessarily large. Four out of seven stations tested by me in the past three months for their constant-load loss have shown that less than two-thirds of the current generated reached the lamps. One station employing a 90-kilowatt, 1,800-light, 1,000-volt alternator with 1,842 lamps wired gave an output of 70 amperes at the switchboard when 840 lamps were burning. The lamps, which were all of one make, were counted between the hours of 7 and 8 P. M., when the customers were requested not to turn off or on any lamps in that interval. The test showed that current for 1,400 lamps had generated at the station with a constant-load loss of 27 amperes. This loss should not exceed eight amperes. The current at the switchboard running 840 lamps should have registered 50 amperes, all of which would indicate that this station ran with a constant-load loss of 20 amperes, or current enough to supply four hundred 16 candle-power lamps, for which the station received no pay. This useless loss was eliminated by putting triple petticoat porcelain insulators in place of the single petticoat S. G. glass, removing one fixed and one intermittent ground on the line and changing 1,400 lights of 5, 10 and 25 light 50-volt transformers to two 250-light, eight 100-light and two 50-light 100-volt transformers. The balance of 400-lights were on the residence circuit, and were changed from 50 to 100 volts without materially decreasing the size of the transformers. When these changes were completed the output at the switchboard was 51 amperes with 898 lamps burning. While formerly most of the output was sold at a given rate per lamp per month when the change was made, every lamp was put on meter, and the losing station converted into a paying property.

Increasing the candle-power will apply to the same extent in meeting ordinary gas competition. We know the public is willing to pay a fourth to a half more for electric light than gas, provided they get full candle-power. Taking gas and incandescent lamps at equal candle-power, the equivalent rates would be as follows:

Gas at $1 per thousand equals 16 candle-power lamps at one-half cent per hour.

Gas at $1.50 per thousand equals 16 candle-power lamps at three-fourths cent per hour.

Gas at $2 per thousand equals 16 candle-power lamps at one cent per hour.

This presumption will certainly leave a fair margin of profit on a competive basis, as the life of the incandescent lamp cuts but one-fifth the figure it did four years ago. The pioneer usually forgets this change in lamp values, and through force of habit and training keeps down the incandescent candle-power.

A new rule hung on the switchboard should read, "Keep up the candle-power to keep your job."

The following efficiencies of 100-volt 16 candle-power lamps are the result of a test made with some of the prominent makes:

	Amperes.	Watts.	Watts per candle-power.
Thomson-Houston	.62	62	3.875
Edison	.55	55	3.437
Buckeye	.56	56	3.500
Packard	.57	57	3.562
Bernstein	.65	65	4.062
Beacon	.54	54	3.375
American	.58	58	3.625
Columbia	.61	61	3.800
Keystone	.56	56	3.500

The price delivered and the guaranteed life are other points which decide the preference, but I hesitate to include the life test through a dislike of a probable criticism of advertising some particular lamp; and again, each batch of lamps filling a given order from almost any maker seems to vary from the average life of the preceding lot.

The "New Lamp," like the "New Woman," will curtail the material used in its construction and produce more effect with a given energy.

A lamp having a life of 500 hours and taking two and one-half watts per candle-power, at 15 cents apiece, or, still better, a 300-hour two-watt lamp, will greatly increase our competitive strength.

The contingency arising from an opposition plant entering your field with neither your permission nor pleasure is, of course, governed by local conditions and your judgment.

Filled with Chesterfieldian courtesy, you might introduce the enemy to your customers and also show him your earnings from the starting of your plant. Not only would your sincerity be doubted, but he would believe you made twice the profits shown, and that if you did not, he could; and even this belief would be direct coupled with a mental pity of how much you have yet to learn in your business. You might even allow there was room for two, or you might conclude to let him go ahead and hang himself on his own proposition. Meantime it is demoralizing your customers, dividing either your business, your profits, or both, and, worst of all, constantly reducing the fixed valuation of your property.

Referring again to the Calumet Gas Company as a successful fighter of competing plants, I will state that this company has but one rule—fight from the shoulder. Drop the prices down at one stroke to a point where the other fellow must lose. Deprive him of all revenue and he is forced to quit. This rule has placed the price of 1,200 candle-power arc service in certain districts of Chicago at 10 cents per night, $2.60 per month.

It may be expedient to state that the Calumet Gas Company has money and a modern plant. If you have neither, the value of fighting from the jump is not altered, as it forces you to draw on other resources to modernize your station—a good thing in itself—or without resources it compels a more liberal and immediate purchase of your plant.

To-day power, arc and incandescent service is produced from the same machine, and any agreement to divide the service is liable to daily abrogation.

The best protection to the value of your property and its revenue is to keep it modernized. This contemplates a continuous expenditure, anticipated and met by the money-earning plants.

The development of the business has demonstrated the economy of large units. In arc service the 100 to 125 light machines have displaced the 35 to 50 light units, with a saving in maintenance of 40 per cent.

In direct-current service the large units effect a saving in maintenance of 20 per cent, which is increased up to 50 per cent by being direct connected.

In alternating-current service the large units effect a less apparent saving in current efficiency, but the slower speed, lower temperature and ability to run continuously make their adoption a commercial gain, apart from the simplification of circuits.

Speed and weight should govern the price of all types. A dynamo running at 600 revolutions weighs nearly twice as much as one of the same design and rated capacity at 1,200 revolutions. It costs 70 per cent more to build. Hence a direct-connected dynamo at 275 revolutions is worth 70 per cent more than a belt-driven machine of the same design at 550 revolutions. When the armature is built directly on the extension of the ordinary engine shaft this may be reduced to 50 per cent on account of the doing away with one box, pedestal and part of the frame.

Suppose a purchaser wants a direct-current belted machine of 100 horse-power or 1,000 lights capacity. He finds the cheapest type a bipolar machine, say, with a speed of 1,200 revolutions, weight 6,000 pounds, price $900, average efficiency 80 per cent, with an armature life of two years if loaded.

In the multipolar machine he finds the high-speed belted dynamo at 1,100 revolutions, weight 6,500 pounds, price $1,000, same efficiency and life as bipolar.

The medium-speed dynamo at 550 revolutions, weight 11,000 pounds, price $1,400, 85 per cent efficiency, armature life five years.

The slow-speed at 275 revolutions, weight 17,000 pounds, price $2,200, 87 per cent efficiency, armature life eight years.

Thus we have dynamos of the same make, if you will, and each of the same rated capacity in horse-power, lamps or kilowatts, ranging from $900 to $2,200 in price, the more expensive machines not always receiving at your hands the consideration they deserve.

The dimensions of the base frame of any dynamo will show when too great a preponderance of weight is delegated to that inanimate object.

Again, the rating given a dynamo by the maker should not always be accepted. The various machines offered should be placed on the same basis of estimating their capacity, namely, assuming the highest point of efficiency as full load, the added capacity of the machine beyond that should be regarded as an overload. Most dynamos are rated at their utmost capacity, irrespective of efficiency or temperature.

A 150-kilowatt alternating dynamo rated at 130 amperes and 1,150 volts is worth but 86 per cent of one of equal quality rated at 150 amperes and 1,000 volts; the first being the out-

put at the dynamo, the latter the output at the center of distribution, where it belongs.

This difference in actual value is reduced to 75 per cent if the first dynamo is rated at full capacity and the latter at its most efficient output.

It may be a question of the value of money to you whether you can afford to buy slow-speed machines at their increased cost.

The Harrison street station of the Chicago Edison Company has shown an extraordinary reduction in cost of current per kilowatt hour by the use of direct-connected machinery; but the units are from 500 to 1,500 kilowatts.

A fair estimate of the added saving in the use of direct-connected apparatus would be a 100-kilowatt machine, 10 per cent; 200-kilowatt machine, 20 per cent; 300 kilowatt machine, 30 per cent; 500-kilowatt machine, 40 per cent; 1,000-kilowatt machine, 50 per cent.

(To be concluded.)

Science.

[*From the New York Sun.*]

It was but last year that the practical importance of a scientific discovery, made several years ago, was brought to the knowledge of mankind. We mean the discovery known as the liquefaction of atmospheric air, spoken of as "liquid air." The researches and experiments of a French chemist, as far back as 1887, had established the law or principle which, within a short time, has become utilized in a remarkable manner and with valuable results, by Professor Dewar, of England. Interesting articles upon the subject have recently been published in the London *Times* and the *Scottish Review*. In short, liquid air, or oxygen, can now be turned out in unmeasured volume as an article of commerce, useful for industrial purposes, and perhaps available in submarine navigation. Patents have been taken out for the necessary machinery and apparatus, which need not be here described. The full importance of the discovery and the range of its application can not yet be guessed at; but Professor Dewar speaks of it in terms that may raise a good deal of hope.

For the year 1896 the first scientific announcement of importance has come to us from Vienna, or rather from the University of Würzburg, and a special cable dispatch about it was printed in the *Sun* of January 7. In short, Professor Routgen, of that institution, is said to have discovered a potency, heretofore unknown, in atmospheric space, through which certain rays penetrate organic matter and other opaque substances, just as other rays penetrate glass. It is alleged that one can look upon the skeleton of a living person through the flesh, and that the discovery has already been used for the photographing of broken bones and of bullets in human bodies. We have not yet heard much about this potency from the scientific world, and we can only smile at the fantastic speculations about it which imaginative writers have indulged in within the past fortnight. If the alleged discovery shall be justified by experience, there will be no one to doubt the exceeding importance of it as an agency in applied science serviceable to mankind.

As to further discoveries in science, we have been interested in a letter recently written by the most eminent electrician in New York, Mr. Nikola Tesla, about a possible discovery for which we shall have to wait. He speaks of the advantages that would accrue to mankind from the demonstration "that the earth's electrical charge can be distributed, and thereby electrical waves sufficiently transmitted to any distance without the use of cables or wires." He believes that "the conveying of motive power in this manner from its source to any place, however remote, would increase many times the productive capacity of mankind." And Mr. Tesla is so bold as to trust that the discovery thus spoken of may be made in the year which has just begun. Few men are entitled to pass a judgment adverse to that of Tesla upon this matter, or upon any question in electricity.

Those people who think that discovery and invention have come to an end, can not be aware of what is going on in the broad fields of science, physics, mechanism and mystery. It is within belief that the twentieth century will give revelations in nature and force far more wonderful than any that have been given in the nineteenth, or in any past time.

Better Street Railway Service in Rockford, Ill.

Judge James Shaw, at Rockford, Ill., on January 17, formally discharged the Title Guarantee and Trust Company as receiver of the West End Street Railway Company, and the property was turned over to the new owners, the Rockford Traction Company, of which Mr. John Farson, of Chicago, is president. The people of Rockford are very much pleased to note the new management, as it is understood it is the intention of the present owners to give the citizens the very best street railway service they have ever had.

A colored boy carrying a pair of skates got on a trolley car in Newark, N. J., the other day. The boy got to monkeying around and finally got one of the skates wedged into the controller on the platform. The boy landed in the street and spun around and around for several minutes. The skate was removed and the car went on its way. The boy was more frightened than hurt. One of the many morals which could be used to adorn this tale is: "A skate is a dangerous thing at any time."

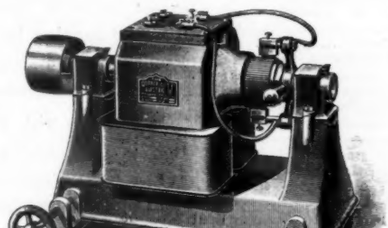
THE PIONEER ELECTRICAL JOURNAL.

The REVIEW has wrongfully claimed to be the "oldest electrical weekly in the United States."
The *Engineer* has no better foundation for its claim as the "oldest and best."
Does it not seem a little unwise, to say the least, for papers to put forth such absurd claims to seniority, when by a little effort their pretentions can be so completely exploded?

The above, obsolete spelling included, is from a recent circular issued by W. J. Johnston, proprietor of the *Electrical World*. We agree with the last paragraph.

The first electrical newspaper established in the United States was the *Telegraphic Journal*, which appeared in 1867. On December 2, 1867, the name was changed to *Journal of the Telegraph*, and this title has continued without change ever since, and the *Journal* is still regularly issued, circulating chiefly among telegraph people, as a monthly publication. Another journal, *The Telegrapher*, was started in 1864, but after an existence of several years was discontinued.

The ELECTRICAL REVIEW is the oldest electrical weekly, having made its first appearance under that name March 22, 1883, although started as a monthly on February 15, 1882, as the REVIEW OF THE TELEPHONE AND TELEGRAPH, by the same editor, Mr. George Worthington.



STANDARD TYPE BIPOLAR QUAKER CITY DYNAMO AND MOTOR.

The Operator, now defunct, was started by W. J. Johnston in 1874—taking his own statement—making its appearance nearly *seven years after* the *Journal of the Telegraph*. Johnston continued publishing *The Operator* about a year after he started the *Electrical World* as a weekly periodical on April 28, 1883. The latter still survives. His other publications, *Industrial America* and *Johnston's Journal*, quietly repose in the mausoleum with *The Operator*, where the latch-string is ever out.

The Electrician was started as a monthly in January, 1882, afterwards changing its name to *The Electrical Engineer*, and becoming a weekly in 1890. The *Journal of the Telegraph* antedates it as the existing pioneer monthly, but it occupied a much broader electrical field than the pioneer publication.

The facts are simply that the *Journal of the Telegraph* is the oldest electrical publication and the ELECTRICAL REVIEW the oldest electrical weekly in the United States.

The "pioneer" claims of W. J. Johnston, so strenuously put forward as of importance, are unconscionably silly and are disproved by known facts and recorded dates.

THREE QUOTATIONS.

The following amusing prediction is from Johnston's *Operator* of March 1, 1882:

"A new electrical journal, called THE NEW YORK REVIEW OF THE TELEGRAPH AND TELEPHONE AND ELECTRICAL REVIEW, edited and published by Mr. George Worthington, formerly superintendent of the Gold and Stock Telegraph Company's telephone department, was issued February 15. It is a bright-looking 16-page paper, not unlike *The Operator* in general appearance and size, though we are afraid that its price ($2 per annum, or 10 cents a copy) will militate against its widespread circulation. Its salutatory announces that the new journal will *confine itself* to the *discussion of electrical subjects*, but since *The Electrician*, of this city, has already occupied that *limited field*, we shall look for an early departure of either one or the other into the realm of general telegraphic and telephonic current events. Indeed, the field which the *Review* and *Electrician* have both chosen is already covered pretty thoroughly in all its important matters, since one can hardly pick up a magazine or newspaper in which the latest electrical discovery is not exhaustively treated. The percentage of telegraphers who make deep researches into the technical mysteries of our craft is decidedly small, and it follows that the circulation of a journal which does no more than *delve into an abyss of algebraical signs* must be correspondingly limited."

The sentiments we italicize have a funny sound to-day, and the prophet soon changed his mind. In less than two years *The Operator* entered "the realm" of the unknown whence no traveler returns; and the author of those prophetic lines, having previously started his existing journal, was devoting his peculiar efforts to the "limited field" of the "discussion of electrical subjects" and clumsily "delving into the abyss of algebraical signs!" Wise men change their minds, fools never; so behold the wise man portrayed above while you broadly smile.

From the *Electrical Engineer*, January 30, 1895:

"The ELECTRICAL REVIEW, January 23, 1895, makes good its right to the claim of priority in weekly issues."

From the *Western Electrician*, January 15, 1895:

"The ELECTRICAL REVIEW was the first general weekly electrical paper published in the United States, and is entitled to whatever distinction there is arising from that fact."

We think it is safe to consider the "pioneer" question settled.

Quaker City Electric Company's Bipolar Motor and Dynamo.

The illustration herewith shows the standard type of bipolar motor and dynamos manufactured by the Quaker City Electric Company, 236 and 238 Carter street, Philadelphia. These machines are made in sizes up to 25 kilowatts. The frame and field magnet cores are cast from soft iron of high magnetic quality. The shaft is carefully made of the best forged steel and is of large diameter. The bearing pedestals are cast to the bedplate, insuring perfect alignment and absolute rigidity and perfectly centered armature. The bearings are self-oiling with large oil reservoirs. The brush holders on the motors are of an improved type arranged for carbon brushes and are reversible.

The armature core is keyed to the shaft. The conductors are of ample carrying capacity, of minimum length and resistance and are completely insulated between the coils. A large heat radiating area is provided, insuring cool running and permitting a heavy overload for short periods. The terminals are all placed on top of the machine, where binding posts are arranged and two main fuse connectors are also placed. These are all arranged on the slate plate, which can be quickly removed, exposing armature to view, but entirely protecting it when in position. The armature can be taken out and set in position by simply removing one bearing. This type of machine is up to date and may be readily handled by novices.

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SPECIAL NOTICE TO ADVERTISERS.

CHANGES for advertisements must be in this office by Friday noon for the following week's issue.

NEW ADVERTISEMENTS should be in the office not later than Saturday noon to insure publication the following week.

NEW YORK, JAN. 22, 1896.

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The up-to-dateness of things is shown forcibly in the following paragraph from the *Wall Street Journal:*

Any responsible house which would like to share a long-distance telephone wire to Chicago can obtain particulars at this office.

If any one was unfortunate enough to read Frenzy's Address to the Romans in our amateur contemporary last week, he must have recalled the sage reflection of the elder Weller on his marital experience: "Vether it's worth while goin' through so much to learn so little, as the charity boy said ven he got to the end of the alphabet, is a matter o' taste."

The modern detective recognizes the value of the telephone as an able assistant in the ferreting out of criminals. Detective Evanhoe, of New York city, laid out an elaborate scheme last week to catch by telephone the thief who stole the Burden jewels. Everything worked to a dot, except that when the man was caught it turned out that he wasn't the man Evanhoe wanted.

In harmony with a recent prediction in this column of the ELECTRICAL REVIEW, it is announced that the People's Power Company, of Rock Island, Ill., has contracted for 12 water wheels of 2,000 horse-power capacity as an extension of its plant. The generation of electric current by water power is a branch of the electrical industry that daily becomes of constantly increasing importance.

On Monday of this week the Commercial Cable Company announced that the cables between St. Thomet, Loanda and Durban Lourenco Marques are broken, cutting off all communication with South Africa, including the Transvaal. This occurrence, in view of the strained situation of affairs in South Africa, may create an unfortunate complication for the American engineers now imprisoned by the Transvaal Government.

It is truly a great achievement to publish a semi-monthly electrical journal. All you have to do is to sit in your office, mark the important news appearing in your weekly contemporaries and tell a $10-a-week man to "fix it up." But then, what's the odds? The people who get the journal free have no complaint, the few people who are genuine subscribers don't know any better (or they wouldn't pay for a semi-monthly) and the advertisers are complacent because the rates are—oh, well, any old price will do.

WALL STREET AND THE ELECTRICAL STOCK MARKET.

The financial atmosphere was not materially cleared by the happenings of the week. The success of the popular loan is a little more certain. On the other hand, the country is one week nearer the end, which in many quarters, it is claimed, will involve a contraction of money for the time being and may result in something like a raid on the gold reserve. Political events, moreover, have been of a nature to create some uneasiness. The policy of the Senate seems to be destructive rather than constructive. It refuses needed revenue and currency legislation and is employing its time in furthering measures that keep the war sentiment prominently to the front. The decision of the Finance Committee to report a measure defining the Monroe Doctrine is the latest case in point. Coupled with these disquieting developments is the uncertainty of the destination of the English Flying Squadron that sailed under sealed orders this week. It is claimed by some that it is headed for America either in connection with the Venezuelan differences or in accordance with an understanding with Spain concerning Cuba.

During the first half of the week the market advanced moderately on a general covering movement in London and America. It was very dull and the buying was purely professional. In the latter days part of these gains was lost through a dwindling of the buying power. In point of tranactions it was one of the dullest weeks of a twelvemonth. Trade reviews do not by any means take a hopeless view of the situation. In the majority of lines there is a move towards recovery from the depression of December. This, it is pointed out, would have been pronounced by now had it not been for the Venezuelan incident, which disturbed confidence and credit and forced the policy of contraction in certain quarters.

Electrical securities were exceedingly quiet and fluctuated within a narrow range. The minimum price of General Electric was 25 and the maximum 26½. The former was recorded on Friday and two sales of the bonds occurred at 85. Fifteen shares of Edison Electric Illuminating of New York sold at 90. The Consolidated 5s recorded transaction at 97¼@98, and the first mortgage 5s at 106¾@107. The interest on each issue is the same, and the difference in price in favor of the old bonds is due to their being the better security. American Telegraph and Cable sold in a limited way at 91.

As the fiscal year of General Electric approaches a close there is considerable speculation as to the showing that will be made for the common stock. My latest advices confirmed

previous statements made in this column, in effect that after meeting all charges and writing off important amounts about 2 per cent will be left.

It would appear that the financiering corporations formed to relieve General Electric during the panic of its unmarketable assets are about to enlarge their field. They are the Street Railway and Illuminating Properties and the United Electric Securities Company. For some time they have owned $702,000 of the $750,000 bonds and $90,000 of the $890,000 capital stock of the Syracuse Electric Light and Power Company. They have jointly purchased control and propose to operate the plant with a view of enhancing its value. New money is to be put into the enterprise.

Considerable interest was created in financial circles this week by the passage of an ordinance by the Chicago Common Council over the Mayor's veto providing for a new trunk street railway line. This is regarded in some quarters as being in line with the Ogden gas ordinance and others of its ilk. It is called the "General Electric Ordinance." The parties interested are maintaining the most complete reticence regarding the plans of the incorporators or their backers. By some it is claimed that General Electric and Electric Storage Battery companies are interested, and that it is proposed to operate in opposition to existing lines. I am informed by a correspondent in Chicago that the parties securing the ordinance are believed to be of but small financial responsibility, and it is their intention to sell out. The measure will be fought by the city corporations, who claim that it is a legal attack, and, even waiving this point, that it contains technical flaws that will render it void.

Chicago Telephone's net earnings for 1895 were $542,838 against $508,576 in 1894. Geo. M. Pullman was elected a director. It is expected that the capital will soon be increased $1,000,000 to $4,796,200.

Erie Telegraph and Telephone Company made a net gain of 791 subscribers for the three months ending December 31, or a total net gain for the year of 2,419, making the aggregate number connected on that date 18,593.

Central Union Telephone, of Chicago, earned net for the year 1895 $355,165, a decrease of $50,823 as compared with 1894.

On the Boston Exchange there was very little of interest in the electrical stocks. Bell Telephone was steady at 198. Erie Telephone lost one point, closing at 60, and New England was unchanged at 86½. Westinghouse common is quoted at 30@30½ and the preferred at 53@53½. In Philadelphia there was only moderate activity in electrical and lighting stock. Welsbach opened and closed at 51. Electric Storage common opened at 24½, advanced to 25¾ and closed at 25. The preferred went from 26 to 27 and closed at 25½.

BAIN.

New York, January 18, 1896.

OUR BOSTON LETTER.

For some time past the Boston Electric Light Company has been endeavoring to obtain authority from the gas and electric light commissioners to issue $250,000 of stock and bonds, $200,000 of which was to be applied to the cost of extensions and additions to its plant subsequent to the date of the petition and $50,000 to funding a portion of the floating debt then existing. The commissioners have recently issued an order approving the issue of $200,000 of mortgage bonds, 30 years, not exceeding five per cent, the bonds and proceeds to be applied in payment of the cost of additions and extensions of the company's plant made since July 1, 1895, or which may be made subsequent to that date. The $50,000 for funding a portion of the floating debt is refused, and the commissioners give their reasons for this action as follows: "The result of the study and appraisal of the company's plant by the experts selected by the board has shown the true relation existing between the liabilities and the visible and tangible assets of the corporation at present values. It is apparent that, although the company has annually appropriated large sums out of income toward the depreciation which has been due to the rapid progress of the art of electric lighting, the sums thus applied have not been sufficient to fully make up for this loss. Compelled by recent legislation to remove its overhead lines from all that part of the city in which they are most numerous and to place its new conductors under ground, the company is confronted with another and extraordinary item of depreciation and another demand for large expenditures in the near future. It is reasonable to expect that the public convenience will require still further extensions to supply the new demands and occupy new territory. Clearly this situation imposes upon the corporation in its own as well as the public interests the duty to apply from its income a much larger sum than heretofore to the payment of its floating debt and toward the cost of new improvements. Such a course will give added strength to the corporation and greater value to its securities. The board is satisfied that the income of the company is ample to permit it to adopt the policy of paying its debts rather than of funding them as a permanent burden. In view of all the facts, the board is able to approve of bonds to meet the cost of new extension, but not those intended for the funding of the debt."

At the annual meeting of the Bostonian Society, held in the old State House this week, President Curtis Guild in his address gave some interesting figures as to the growth and prosperity of Boston during the past decade. Land values alone have risen from $320,133,375 to $432,132,850, a gain of $111,999,475. As the population increased 44.5 per cent, it follows that the land in the city of Boston, despite a vast amount of filling and development, is worth less per capita than it was in 1876. The value of the buildings has increased $105,024,325, being $311,154,750 this year. This is a gain of 50.9 per cent, and larger than the population. Buildings have increased over one-half while land gained only a little over one-third in value.

It is reported that the West End Road has closed a contract with the General Electric Company for 400 motors, amounting to something like $150,000.

There seems to be some little misapprehension about the decision handed down by Judge Colt in the latter part of December on the matter of an extension of time for taking evidence in a telephone suit, the idea having got abroad that the Beliner suit was the one referred to. This is not the case, however, the decision being in relation to an old suit started by the government in January, 1886, for the annulment of the two original Bell patents, one of which was granted in 1876 and the other in 1877. These patents covered the fundamental principles of sound transmission and both have long since expired. While the suit is a dead issue so far as it affects the present situation, and will never come to trial, it affords an excellent example of what lawyers can do in the way of prolonging a case, especially when it affords them a good, fat annual income. It is brought into court periodically and an extension of time asked for. The judges smile and grant it, having a full understanding of the situation. An idea of the colossal humbug involved may be gathered from the fact that the testimony already taken would cover 15,000 printed pages.

H. G. T.

Boston, January 18, 1896.

Maguire & Baucus, Limited.

In the ELECTRICAL REVIEW for January 8, 1896, mention was made of the incorporation of Maguire & Baucus, Limited. Since then the company has elected the following officers: Joseph D. Baucus, president; Franck Z. Maguire, vice-president and general manager; Walter B. Howe, treasurer, and William M. Paxton, Jr., secretary. Offices have been established at 44 Pine street, New York city, and Dashwood House, 9 New Broad street, London. This company has been formed chiefly for the purpose of export business in electrical apparatus, specialties etc., and has connections throughout Europe and South America. Messrs. Maguire & Baucus have marketed Mr. Edison's latest invention, the kinetoscope, all over the world outside of the United States, have been very successful and are well known in electrical circles.

Electric Cars on the Brooklyn Bridge.

It was reported last week that the trustees of the New York and Brooklyn Bridge propose to equip one car in each train with an electric motor for the purpose of switching the train and helping the train up grade when necessary.

STORAGE BATTERIES IN CENTRAL STATIONS.

READ BEFORE THE NORTHWESTERN ELECTRICAL ASSOCIATION, MILWAUKEE, WIS., JANUARY 15–17, 1896, BY MAURICE BARNETT.

Those who were present at the last convention of the Northwestern Electrical Association will recall the paper on "Storage Batteries in Railway Plants," read by Mr. Herbert Condict, and will also recall that the paper in question did not excite any unusual discussion. At the Cleveland convention of the National Electric Light Association Mr. Nelson W. Perry reviewed the general aspects of the "Storage of Energy," and expressed what he considered to be the relative value of different forms of storage apparatus in a central station. So far as his remarks on the storage battery were concerned, there was very little concurrence of opinion with him, and the discussion that was started drew from a number of practical engineers expressions that were favorable to the use of storage batteries in central stations. At the meeting of the American Institute of Electrical Engineers, held November 20, 1895, not fewer than four able papers were read on the subject of storage batteries, and the general concensus of opinion seemed to be that storage batteries, looked at either from the standpoint of first cost or general utility and economy in the station, were a decidedly valuable adjunct of central stations. Again, two years ago there was only one important storage-battery plant in use in a central station in the United States, and station managers were not seriously considering the installation of this form of accessory apparatus. During the past two years very large battery plants have been placed in Boston, in New York and in Lawrence, Mass., by local Edison companies, while two battery installations have been made in Merrill, Wis., and Anaconda, Mont., in connection with railway power plants. Since the first installation was completed at Lawrence, Mass., the battery capacity has been doubled, and it is understood that the advisability of increasing the capacity of some of the other stations in the same way is conceded. Negotiations for storage battery plants for other central stations have been carried on for some time and will probably end in our seeing the number of our existing battery plants very greatly increased.

What, it may be asked, has occasioned the change of attitude of electrical engineers and station managers towards the storage battery? The answer to this is:

"1. Litigation no longer stands in the way of the use of any of the standard types of batteries.

"2. The application of special types of batteries to special kinds of work has resulted in a vastly improved performance of battery plants in meeting the exigencies of station work. This refers especially to performance of battery in acting as a reservoir for storing the energy represented by the difference between the average and the maximum load, as a regulator of pressure on circuits subject to varying demands and as a transformer utilizing high-voltage charging currents and discharging at any lower voltage desired.

"3. It is generally recognized that plants part steam power and part storage battery are cheaper than all

steam power plant would be for the same work.

"4. The use of the batteries in sub-stations frequently permits a saving in conductors between the central and the sub-station."

With regard to litigation, it may be said that formerly when one bought a storage battery one contracted the liability to a lawsuit at the same time. It is now generally known that this incubus on the storage battery business has been removed. One large company, ably managed, has obtained control of this business by securing to itself the right to manufacture in the United States storage batteries of all the important types heretofore developed. It has also obtained control of valuable foreign patents, as those covering the manufacture of the "chloride accumulator" and of the "Tudor" battery. The field has thus been cleared of litigation, and those wishing to use storage batteries can do so without apprehending annoyance or loss in any way. This element of uncertainty was removed simultaneously with the dispelling of the prejudice against storage batteries, caused by their failure in certain applications for which, especially in their undeveloped form, they were notoriously unfit, a circumstance that has been of infinite value in removing the most important obstacle to the use of storage batteries in places where they were specially adapted.

Before taking up the practical side of this subject as covered by the adaptability, performance and economy of storage batteries in central stations it may be interesting to review a few typical battery plants here and abroad, which have been installed to perform both regular and special functions. From the *Railway World* of November 12, 1895, the following paragraph is taken:

"The first accumulators used in connection with a railway power station, were, so far as the writer can ascertain, those employed in the power plant of the railway lying between Zurich and Hirslanden, Switzerland, an account of which was published in the *Elektrotechnische Zeitscrift* of June 28, 1894. According to report, the dynamo delivers current under a constant load, the accumulators being charged or discharged as load on the line is less or greater than the output of the dynamo. In this plant there were automatic means for cutting in and out of end-cells to keep the voltage constant. Results showed that by means of the accumulators a saving was effected of 2.2 pounds of coal per hour, amounting to nearly a ton per day, or $2,500 a year. The cost of accumulators, installed complete with accessory apparatus, was $7,400. Allowing for interest and depreciation, the battery paid for itself in four years by saving in coal bills alone. The saving was effected by reason of there being no necessity for keeping a second boiler and steam engine in reserve, and that by this arrangement the power plant ran at its highest efficiency. It was furthermore developed that the first cost of combined steam-power and battery plant was less than cost of total steam-power plant would have been for the same work."

Two interesting battery applications were recently made abroad in the power plants of the Douglas-Laxey line and the Snaefell Mountain Electric Tramway—both in the Isle of Man. In the Douglas-Laxey line it requires a current of 150 amperes at 500 volts to carry a car up the eight and one-half per cent grade at a nine-mile rate. Before the battery was connected to the line the cars did not run very smoothly, owing to the variations produced by the starting of other cars. When the battery was connected to the line the cars ran with exceptional smoothness, the accumulators keeping the voltage steady and eliminating the variations due to sudden starting of cars.

The Mt. Snaefell battery plant consisted of 246 special cells of the chloride accumulator type. At 550 volts battery furnished 176 amperes for 3 hours, 112 amperes for 6 hours, 84 amperes for 9 hours and 72 amperes for 12 hours. The battery was used in precisely the same way as that on the Douglas-Laxey line, with the exception that a special use was made of it at seasons of the year showing but little traffic. By agreement the line bound itself to run two cars a day each way every day of the year. As it would not pay to keep the power house in operation just for this load, the practice was adopted of charging the battery once a week and allowing it to carry the whole load for the other six days.

Lastly, there is the Germantown plant. This battery installation is used to carry the peak of the load and also the minimum load. Speaking of this latter function, Chas. M. Allen, the superintendent, has put himself on record as follows:

"In the second place, we do not have sufficient day load to pay us, * * * and it is here the battery comes to our relief. Before we used the battery the loss on our day circuits was more discouraging. By the use of the battery we have wiped out this loss and can show some profit besides. We now shut down the machinery in the early morning, and the battery carries the entire load until nearly dark; then after midnight, while the load is light, but while we must still run our city lights, we charge the battery; and it is a fact noticed by our engineer, as shown on his reports, that he uses about the same quantity of coal on nights he does not charge the battery as when he does."

We can now take up in a general way the questions of adaptability, performance and economy of a storage battery in a central station, considering these in the following order:

"1. Ability of battery to carry peak of load.

"2. Economy of battery to carry minimum load.

"3. Ability of battery to regulate pressure.

"4. Storage batteries in sub-stations."

It is a fact, which managers of central stations will testify to, that the maximum output of an electric lighting plant is limited to one and one-half hour or, at most, to four hours a day. In designing a central station the engineer must choose between several alternatives. First, if he puts in a complete steam-power plant of most modern type to handle the maximum load, over half of the plant will be idle the greater part of the day, from which it will follow that the profits of lighting will be greatly reduced by large interest charges and heavy stand-over losses in the boilers. Such a plant, besides being very expensive, has no reserve capacity in case of accident. To off-set the question of large first cost it has been proposed to introduce the best type of economical machinery to handle the average output with some less expensive apparatus to take care of the overload. For the latter work Mr. Perry has proposed gas engines to drive extra dynamos. Such a plant, while avoiding the stand-over losses to which a boiler plant is subject and showing smaller interest charges, is open to the objection that amortization expenses of cheap machinery, not to speak of loss in efficiency, counter-balance the saving in interest. Nor has such a plant any reserve capacity in case of accident. Mr. Perry's suggestion of gas engines would be valuable were it not for the fact that every failure to ignite would appreciably alter the speed of the dynamos, as gas engines can not maintain their speed when obliged to make two revolutions on a single explosion. As a matter of fact, in gas-engine plants a storage battery is considered almost absolutely essential as a regulator and as a reserve against breakdown. Lastly, there is the combination of a steam-power plant to handle the average output and a storage battery to take care of the overload. Storage batteries of central station type can be installed for this work for about one-half what a steam power plant would cost, making a plant half steam power and half storage battery cost only three-quarters what an all-steam power plant would for the same work. Mr. C. L. Edgar, general manager of the Boston Edison Illuminating Company, which is the owner of the largest storage battery plant in the world, has put himself on record as to the accuracy of the above figures.

A question that arises here is as to the maintenance cost of such a battery. Generally speaking, it should not exceed that of direct-generating machinery. In work of this kind, therefore, the storage battery has undoubted economic value, as it suggests the way of designing a central station that will be only moderately expensive and which will be safeguarded against stoppage arising from accident to the generating machinery.

Coming now to the question of using storage batteries to carry the minimum load, it may be said that opinion is divided on this point. Abroad, where the motor load is insignificant, the minimum demand for power lasts for half a day. It is thus possible to get along with a single shift of men, and something is also saved by drawing the fires, banking the boilers or other practice when it is not intended to run the plant, and it is considered more economical to let the battery take care of the minimum demand than to handle it with the direct minimum machinery. In this country the motor load is very important and the minimum load lasts from only four to six hours a day. A whole shift of men can not thus be saved. Experiments have been tried in Boston on a large scale with a view to ascertain the value of a storage battery in this connection. As yet no definite conclusion has been reached on this point. Undoubtedly there are numerous cases where the minimum load is small and lasts for half a day at least, making it economical to use a battery. The Germantown plant, already referred, to is a case in point where most satisfactory results are obtained by using a battery in such a connection.

One of the most important and valuable functions of a storage battery in a central station is as a regulator of pressure. To any one who watches the variations in the voltage and ampereage of generators running with and without storage batteries conviction will soon come that the voltage varies perceptibly less when a battery is arranged in parallel with the generator than when it is not. When a shunt-wound dynamo such as are used in central stations is running alone any increase in ampere output will be attended by a fall in voltage. When, on the other hand, a battery is combined with the dynamo the moment the pressure falls from a large demand for current on the line the battery begins to discharge and thus augments the output of the dynamo. In other words, the battery acts as a reservoir; when the load on the line is small the battery is charged; when the load becomes heavy the battery begins to discharge, and in so doing performs a doubly valuable function. In the first place, it saves the generating machinery from strain, and, secondly, by keeping the pressure constant makes possible a much higher efficiency both in the station and on the line. Mr. Edgar has said that if a steam plant and a battery plant were on a par in all other respects, he would personally feel very much inclined to install a battery plant for the above reason alone.

Lastly, we come to the question of the use of storage batteries in sub-stations. Just imagine a city which has spread out irregularly. At some distance from the central station it may happen that the population is large and that considerable current will be required to furnish adequate light. If the situation is such that it is cheaper to furnish light from the central station than to operate a small power plant as a sub-station, the former will be done. The consequence of this will be shown in very heavy losses in the line owing to large currents transmitted, and, secondly, there will be heavy interest charges for very large conductors. If, on the other hand, a storage-battery sub-station were located in the center of this suburb, the following economies would be gained: In the first place, much smaller conductors would be employed, resulting in diminished interest charges, and, secondly, a high-tension current would be used in transmission, by which losses on the line would be lessened. These economies are brought about by the ability of the battery to act as a "transformer." In other words, the battery may be charged in series with a high-tension current and discharged in multiple, bringing the pressure at the sub-station down to requirements.

On the other hand, a battery may be charged in multiple and discharged in series, by which it will be possible to get along with one dynamo instead of two or more in series. Owing to the flexibility of storage batteries they are splendidly adapted to working on a three-wire or a five-wire system.

There is one point that has not thus far been touched upon, namely, the local consumption in a station consisting of both generators and batteries. The use of storage batteries is sometimes objected to on the ground that there is a loss of 15 to 20 per cent of the watts generated while the battery is being charged. Perhaps we can do no better than by quoting Mr. Edgar again: "The watts lost," says Mr. Edgar, "by the inefficiency of the battery are made up more than fourfold by the better economy of the steam plant. We have taken typical Winter days and figured out exactly the cost of running our system with the battery and without, and have proved that the actual coal consumed with the battery is a material amount less than without it."

To recapitulate, storage batteries are valuable in central stations on account of the threefold function they perform as reservoirs of energy, regulators of pressure and transformers of high to low or low to high-tension currents. In performing these functions they make possible lower first cost in the main central station and lower first cost for conductors between this and the sub-stations where batteries may be installed. They are further valuable in saving the power and generating machinery from strain and in effecting economy by introducing the factor of high efficiency in the station and on the line.

PERTINENT OBSERVATIONS.—II.

From time to time we notice in the English electrical journals complaints of the unfair conditions under which honest and capable contractors labor in competition with those who are neither one nor the other, or who may be one without being the other. Our friends across the pond have no monopoly of this kind of thing. Quite recently, in a considerable city not far from the "modern Athens," an instance occurred showing that even now some elementary lessons in Ohm's law and the four rules of arithmetic would be of advantage to some of our so called "electricians." Bids were called for for wiring a building to be supplied with current at 50 volts from the local company's system (transformed from 1,000 volts alternating), and three bids were submitted, two of which were considerably lower than the third (the sizes of wire for the last named having been worked out by an independent electrical engineer). The two lower bids did not, it was found, provide for sufficiently large wire to comply with the conditions governing the amount of drop, though the bidders stoutly maintained they were right. Further than this, the superintendent of the local company supported them, which to one unacquainted with him would seem strange. The unfortunate third bidder "argued high, he argued low, he also argued round about him." To no avail; the architect did not know how to calculate the matter; he *thought* the third man's figures seemed all right, but the simplest plan was to count heads, and the ratio of 3 to 1 settled it. When, or if, the actual drop is tested—but "that is another story."

The question is a little interesting in itself as showing apparently that the cheap men were deceived by using one of the numerous "tables" to arrive at the sizes of conductors. That, at least, seems the most charitable explanation. The conditions were these, understood and agreed on by all:

Voltage, 50; amperes, 170; distance to center, from which current was to be distributed by different circuits, 100 feet; loss in potential at farthest lamp, with all lights in operation, not to exceed one volt, or two per cent, half in the feeder from transformer to center of distribution and half in the distributing circuits, approximately. The highest bidder claimed that the feeder should be of four wires of 0000 Brown & Sharpe each on a side, or 800 feet of wire; the lower bidders, that two of 0000 were enough, or 400 feet. Now, a simple calculation will show that the joint resistance of 200 feet of four 0000 wires is .00256 ohm, which, multiplied by 170, gives 0.4352 volt, or a little under one per cent. On the other hand, *two* 0000 wires (.05129 per 1,000 feet) show $\frac{.05129}{2} \div 5 =$ .005129 for 200 feet, which, multiplied by 170 = 0.8719 volt, or nearly one and three-fourths per cent in the feeder alone, only about one-eighth of a volt remaining for all the remainder of the system of distribution. Probably the table gave four 0000 wires. If you see it in a "table," *it's so.* "Simple enough—four wires—100 feet—400 feet. Let 'er go."

This same superintendent has a rule that he will not connect his lines to any wiring installation the drop in which is above a certain percentage. Now, he cannot well "go back" on himself. Who suffers?

J. E. T.

Receiver for a Kansas Telephone Company.

Charles O. Knowles has been appointed receiver for the Topeka Telephone and Electrical Company, of Topeka, Kas. The receivership was asked by the City Real Estate Trust Company on a claim of $11,000, with interest from May 1, 1895. The real estate company is trustee for $15,000 worth of bonds issued by the company. Of these $5,000 were bought by Edward A. Rozier, of St. Louis, and afterward $6,000 more were sold to him, with the remaining $4,000 held as collateral security. This makes the amount of the bonds held by Rozier $11,000, for which the real estate company is trustee. The action is regarded by the members of the company as a friendly step to tide the company over until claims they say are unjust can be settled.

Wanted—A Battery.

TO THE EDITOR OF ELECTRICAL REVIEW:

Please inform me where I can buy the Taylor battery.

Yours truly,

C. M. E.

Everett, Pa., January 11.

An Electric Chain Hoist.

The rapid development which has taken place in the electrical field during the past few years brings to even the casual observer many thoughts and fancies regarding the vast future which is still before this industry. How much more must it interest the persons who are actively engaged in this field, and how much it should, and, in fact, does, interest the manufacturer, who, if he only stops to consider the matter, must admit that his profits or losses in many cases really begin at his coal pile. Does the average manufacturer realize what per cent of power is lost in his main and counter-line shafting, belting and pulleys through the poor alignment, the loose belts, the numerous transmissions and the wear and tear? In the average shop there is said to be a loss of at least 50 per cent between the power generated and that which is available for the operation of the tools.

AN ELECTRIC CHAIN HOIST.

What a contrast is presented in the equipment of some factories as they have recently been equipped. A strange absence of shafting, belting and pulleys; instead, small motors directly connected to the different tools, making an equipment not only neater in appearance and one where there is less danger to employés, but also one that is far more efficient; where, when a tool is stopped, the coal pile is affected—not the nearest counter-shaft.

One of the many moves in the line of direct-connected apparatus is shown in the chain hoist here illustrated, which is a very useful piece of machinery, especially in electric light and power stations, iron and steel foundries, factories, etc., and for handling heavy freight.

This is one of the products of the Storey Motor and Tool Company, of Philadelphia, and the type illustrated is of 10,000 pounds capacity. This hoist is operated by a five horse-power motor, and will lift 10,000 pounds five and one-half feet per minute and lighter loads proportionately faster. It will lower at the rate of 10 feet per minute. By means of the reversing controlling box, which comprises a part of the apparatus, the hoist will raise and lower anywhere within the above speeds at the will of the operator. The starting, stopping, regulating and reversing of the motor are controlled by the two ropes shown in the illustration, which are connected to a wheel on the reversing rheostat, which is automatic in its action, the current being cut off as soon as the rope is released.

Standard Samples for Naval Supplies.

Electrical manufacturers will be interested in the fact that Secretary of the Navy Herbert has ordered the establishment of a Board on Standard Samples of the supplies used in the United States Navy, with headquarters in the Stewart Building, New York city. The board was organized for the purpose of facilitating the purchasing of supplies for the navy, to obtain the widest competition in making these purchases and the establishment of standards of all commercial articles necessary in the navy. The board consists of Pay Director L. G. Billings, president; Chief Engineer Albert W. Morley, Commander Timothy A. Lyons, Lieut. J. A. H. Nickels and Assistant Naval Constructor Lloyd Bankson, all of the United States Navy.

Outside of the Ordnance Department there are more than 12,000 articles which must be purchased at different times for naval equipment. This new board will standardize all the commercial articles, and their work is designed to overcome a great deal of the red tape which has heretofore hindered the rapid transaction of business with the Navy Department. The board invites the submission of estimates and catalogues by manufacturers throughout the country of all articles dealt in and required by the navy, and specific information thereon.

General Electric Company's Publications.

The ELECTRICAL REVIEW has received copies of three publications issued by the General Electric Company during the Cotton States and International Exposition at Atlanta, Ga. One is a folder, handsomely illustrated and printed, giving particulars of the company's exhibit at Atlanta and of its recent progress in all branches of electrical work. A souvenir catalogue is devoted to illustrated descriptions of the Thomson recording wattmeter. The third publication consists of illustrations showing recent installations and noteworthy apparatus made by the company.

TELEPHONE NEWS AND COMMENT.

The People's Telephone Company will soon put in operation its exchange at Hot Springs, S. D.

The net earnings of the Central Union Telephone Company for 1895 are given as $335,165 as against $405,988 for 1894.

The Bell Telephone Company, of Buffalo, N. Y., has adopted the message-rate system and now furnishes service at from $30 a year upwards.

The Erie Telegraph and Telephone Company made a net gain of 781 subscribers for the three months ending December 31st, or a total net gain for the year 1895 of 2,419. Total number connected December 31, 1895, 18,593.

The repairs and alterations in the Amherst, Mass., telephone system, including the extension of the metallic circuit, are about completed and the service will hereafter be greatly improved.

The American Telephone and Telegraph Company will erect a three-story and basement brick building at 4701 and 4703 South Kedzie avenue, Chicago. It will cost $18,000 and will be used as an exchange building.

Dr. C. A. Eisenhart has been elected president and Charles Frick, secretary, of the York, Pa., Telephone Company. The company expects to arrange for telephone connection between the surrounding towns.

The Vermont Telephone and Telegraph Company are settled in their new quarters in the Blanchard Opera House block at Burlington, Vt. The many improvements in their new office and on their line will greatly facilitate the doing of business.

A dispatch to the Omaha *Bee* from Hot Springs, S. D., says: "The old Black Hills Telephone Company have virtually quit business in the southern hills, and they have but one instrument left here. Their exorbitant rates and corporate greed killed their business here."

The net earnings of the Chicago Telephone Company for 1895 are given as $542,838 as against $508,576 for 1894. It is expected that the capital stock may soon be increased $1,000,000, making the capital of the company $4,796,300. Geo. M. Pullman has been elected a director.

The city of Marion, Ohio, and the Central Union Telephone Company are at odds. The City Council wanted to string fire-alarm wires on electric light and telephone poles combined. The telephone company said no, and secured a temporary injunction. The city in its answer says that the telephone company has no franchise and a hot fight is expected.

The American Telephone and Telegraph Company and the Cumberland Telephone and Telegraph Company entertained a large number of guests from 2 to 5 P. M. on January 16, at the Hotel Henderson, Henderson, Ky., to witness the opening of the long-distance telephone line connecting that place with New York, Chicago and the principal Eastern and Western cities.

The Saco River, Me., Telephone and Telegraph Company has declared a dividend of five per cent, payable April 1. The company will build a new metallic circuit and extend the line from Clark's Mills to Center Waterboro, at which place it will connect with the Cornish and Limerick line. The officers of the company are Hon. M. P. Emery, of Portland, president; Chas. F. Clark, of Hollis, vice-president; John Berryman, of West Buxton, secretary and treasurer; Freeman Palmer, of Bar Mills, superintendent; Hon. C. P. Harmon, of West Buxton, auditor.

The stockholders of the Octoraro Telephone and Telegraph Company recently held a meeting at Oxford, Pa., and elected the following directors for the ensuing year: S. R. Dickey, Joseph M. Showalter, E. B. Patterson and Ely McKissick, of Oxford; J. K. Fairlamb, Boardley S. Patterson and J. L. Walker, of Little Britain township; E. L. McSparran and William Wood, of Fulton township. The company is said to be in a flourishing condition and has 35 miles of wire stretched and 15 telephones in operation. The line will run between Oxford and Peach Bottom. Thirty-five additional telephones have been contracted for.

The New York & New Jersey Telephone Company is having a hard time to keep its poles standing in Bayonne, N. J. The residents of that town have got out axes, injunctions and other things which make it slightly difficult to keep a line standing. Several property owners object to new pole lines being erected because they have been told that they are intended solely for the long-distance service between New York and Philadelphia. A similar system of poles and wires already stretches along several principal avenues and side streets, and some of the taxpayers declare that the corporation has never requested permission to erect the poles and wires. It is expected that the matter will be amicably settled this week.

Wholesale Asphyxiation.

Escaping gas from a leak in the main of the Boston Gas Company on East Canton street, Boston, on January 15, filled a whole block of houses on each side of the street, and but for the prompt discovery 100 lives would have been sacrificed. As it was, one person died, three others were in a precarious condition and 21 others were under treatment the following day.

ELECTRIC LIGHT FLASHES.

In his inaugural message to the Common Council of Syracuse, N. Y., Mayor McGuire recommends that the city build and operate its own electric lighting plant.

The Chamberlain, S. D., Electric Light Company recently struck an artesian well giving an immense flow of water. It is said to be one of the best artesian wells in the Northwest.

The Lewiston & Auburn (Me.) Electric Light Company has leased the valuable water power on the Little Androscoggin River known as the Gay power, situated near Littlefield's Corner.

A franchise for an electric lighting and power plant has been granted to Charles F. Speed, of McGregor, Ia. Work will commence soon, and a gas engine will be considered for use as power.

Stockholders in the Edison Electric Illuminating Company of Fall River, Mass., and the Fall River Electric Light Company propose to consolidate their interests, and a petition has been introduced in the legislature with that end in view.

The General Electric Company will soon commence work on the $500,000 plant it is to establish in Los Angeles, Cal. In the thickly settled portions of the city the company will put its wires under ground. In the suburbs they will be strung on poles. The plant will have a capacity of 30,000 incandescent lights and 500 arc lights.

The Port Jefferson, L. I., Electric Light and Power Company has collapsed. It was organized a few weeks ago with L. Chambers as president and W. T. Wheeler, secretary and treasurer. The capital stock was $7,500. Mr. Wheeler is making a canvass of the village, and if he can get a sufficient number of subscribers he says he will purchase a plant and light the village.

Though John I. Blair is 92 years old, he still takes great interest in public affairs. The electric light plant at Blairstown, N. J., has recently been completed, and the current was turned on by Mr. Blair. The entire expense of the work, amounting to nearly $50,000, has been assumed by Mr. Blair. He will give a deed for the plant, together with the valuable mill property from which the power is obtained, to the Blair Presbyterian Academy, which he has already endowed to the extent of $600,000.

The Massachusetts Gas and Electric Light Commissioners have approved the issue of $200,000 new five per cent 30-year bonds by the Boston Electric Light Company, the proceeds to be applied to the recent improvement at the central station, for the enlargement of the South Boston plant and other extensions. The commissioners only authorized the issue of bonds after having made an appraisal of the company's plant by its own experts, who found that the present value of the plant, taken at present cash prices, would more than equal outstanding bonds and stock.

ELECTRIC RAILWAY NOTES.

The annual report of the Chicago City Railway Company shows 14.41 per cent earned on the stock, as against 13.5 last year.

The Cleveland, Canton & Southern Railroad has reduced passenger rates to meet the competition of electric railways in Northern Ohio.

It is reported that the receipts at the Windsor (Conn.) railroad station have fallen off $1,000 a month since the establishment of the electric line.

The Brooklyn City Railroad Company, of Brooklyn, N. Y., recently declared a quarterly dividend of two and one-half per cent, payable January 15.

The Manhattan Railway Company, which owns the elevated railroads of New York city, runs 3,250 trains a day, averaging four and a half cars to the train, and carries about 600,000 passengers a day.

Postmaster Sullivan, of Brooklyn, N. Y., has been authorized to open a new mail trolley line in that city on February 3. The route will be on the Brooklyn, Queens County & Suburban line, in Broadway, from Kent avenue to Alabama avenue.

The New York State Board of Railroad Commissioners has approved the request of the Metropolitan Traction Company for permission to use the underground trolley system on Lexington avenue between 105th street and the Harlem River and on the Twenty-third street line in New York city.

A jury in the Supreme Court, Brooklyn, N. Y., on January 15, awarded a verdict of $20,000 damages in a suit brought by the guardian of Antonio Crevano against the Atlantic Avenue Railroad Company. Crevano, who is five years old, was knocked down by a trolley car owned by the company while crossing the street on September 13, and both of his legs were cut off.

What might be called a "motorman's pose" says the New York *Sun*, has been developed by the trolley cars, according to observations made at a ball given by the trolley motormen in Worcester, Mass., last week. It is alleged that while resting between the dances every motorman stood on one foot. When running a car the motorman must stand on one foot and have the other free to pound the gong, the gong being pounded incessantly, as any Brooklynite will testify. Thus a necessity of work has developed into a habit at all times. This is a subject for the consideration of the evolutionist.

Highly Regarded.

To the Editor of Electrical Review:

Will you please send me a sample copy of your Electrical Review? Have heard it spoken of very highly.

Yours truly,

C. J. Webster.

Walton, N. Y., Jan. 16.

The central stations of Berlin, Germany, supply current to 10,537 arc lamps and 203,532 incandescent lamps. Besides these there are 25,332 gas and 1,200 kerosene lamps used in city lighting.

Quick Work by the Jewell Belting Company.

The Jewell Belting Company, of Hartford, Conn., possesses many friends in the electrical field, not alone for the excellence of its product, but also for the promptness and ability in filling "rush" orders. Recently a break-down occurred in the station of the Albany Street Railway Company, and a belt was telephoned for to the Jewell company Sunday afternoon. Mr. Charles E. Newton, the secretary and manager of the company, realized the urgency of the case, and, putting men to work on the order immediately, was able to ship the belt so it was in Albany on Monday. The belt was a 48-inch one, and the promptness of its delivery saved the Albany company much annoyance. A similar "rush" order was filled by the same company for Mr. Geo. Redman, the well-known electric light man of Rochester, N. Y. Among recent purchasers of the Jewell belting was the Albany Illuminating Company, a 60-inch two-ply belt constituting the order.

Young Men's Institute.

The eleventh anniversary of the Young Men's Institute of the Young Men's Christian Association was celebrated in the Institute Hall, 222 Bowery, New York city, Tuesday evening, January 14, 1896. Music was furnished by the Association Quartette, and the address of the evening was delivered by Rev. Charles T. Weitzel.

The secretary's report showed that during the year over 1,000 young men have received benefits as members of the Institute, either in the gymnasium or in the evening educational classes. The commercial branches are taught, also steam engineering, practical electricity, carriage drafting, mechanical, architectural and free-hand drawing, vocal music and other subjects.

The members have a literary society, a mandolin club, outing clubs and other organizations for mutual improvement and recreation.

Forty-five lectures and concerts have been given in the hall during the year.

The deposits in the savings fund amounted to over $8,000.

Through the Medical Benefit Club many of the members received treatment.

The total expenses of the year amounted to $11,764.

Any young man over 17 and under 35 years of age, on payment of a fee of $4, is entitled to the privileges of the Institute for one year. A copy of the annual report can be had of Dr. D. E. Yarnell, 222 Bowery.

The Institute for Home Study of Engineering.

The expansion of electrical industries and the growing demands upon all men engaged with them for more than a superficial knowledge of a few principles of electrical science, have caused a large number of electrical schools or electrical departments of established colleges to spring into being. Electricity being a science requiring the use of apparatus in its study almost from the first elementary principles, this widespread interest in it has been accompanied by a demand for apparatus with which to pursue its investigation. The Institute for Home Study of Engineering, of Cleveland, Ohio, one of the educational institutions alluded to, has designed experimental apparatus, principally for its own students, but well adapted for all electrical laboratory work.

The dynamo and combined volt and ammeter, which it has recently perfected and now manufactures, are shown in the accompanying illustrations. Two of the engravings represent the dynamo—one showing it complete and connected for operating, the other ready for winding, with the materials therefor grouped around the frame. The latter is the condition in which it is placed in the hands of the students of the Institute. The electrical course of that school requires the actual construction of a dynamo by every student and its use in experimental work, and the medium was designed to supply that want, together with the other apparatus, the managers not being able to find on the market suitable equipment at prices within the means of the average correspondence student.

The excellent views render a lengthy description unnecessary. It is a four-pole 250-watt machine, made for commercial as well as experimental work, the construction being first-class in every respect. As will be seen, the head of each commutator bar has a set-screw. This is for conveniently altering the current of the coils for the large number of changes which the design permits. Without reconstructing the coils 25 changes are made, 15 as a direct-current and 10 as an alternating-current machine. The collector rings are provided for slipping on and off the commutator for the alternating-current work, an extra set of brushes for taking off the current uncommutated being furnished. The machine is self-exciting. After the principles of dynamo design are studied the student is very greatly aided in acquiring a practical knowledge of what he is endeavoring to learn by winding the field and armature coils, placing and connecting the machine and changing the connection for different experiments coming in his course. The upright piece in the two illustrations is a foot rule to indicate the size of the frame. The dynamo weighs 70 pounds. The combined volt and ammeter is different in form and construction from others using its principle. It is carefully constructed and can be wound for any current or voltage.

Further particulars and information concerning the Institute and its work may be had by addressing the Scientific Machinist Company, 53 and 54 Blackstone Building, Cleveland, Ohio.

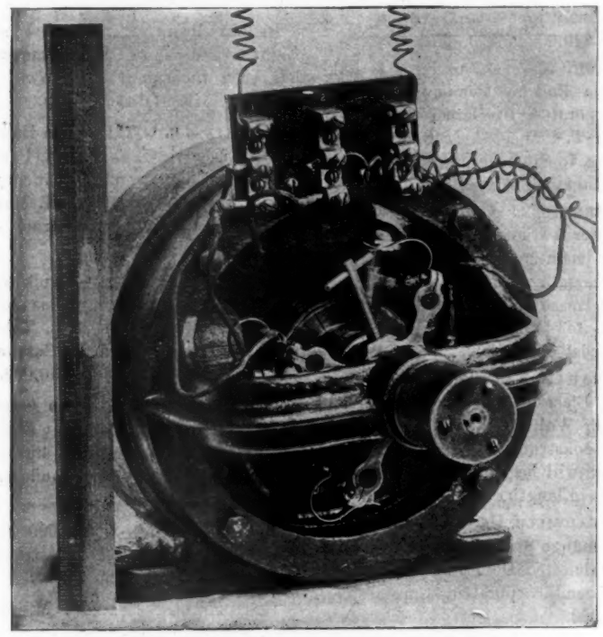

FIG. 1.—250-WATT EXPERIMENTAL DYNAMO.

OBITUARY.

Marcus Marx, of Brooklyn, N. Y., vice-president of the Drawbaugh Telephone and Telegraph Company, of New York, dropped dead at the entrance of the *Times* Building, Park Row, New York city, on January 13. The cause of his death was an apoplectic stroke. Mr. Marx was 69 years old, and had made a fortune in the wholesale dry goods business.

John W. Duxbury, superintendent of the Central Division of the New England Telegraph and Telephone Company, died at Lowell, Mass., January 13, 1896, aged 51. He was an old-time telegrapher, and was for many years a sub-chief in the Boston office of the Western Union Telegraph Company, and was afterwards located at Providence as a telephone manager. He was well known in telephone and telegraph circles.

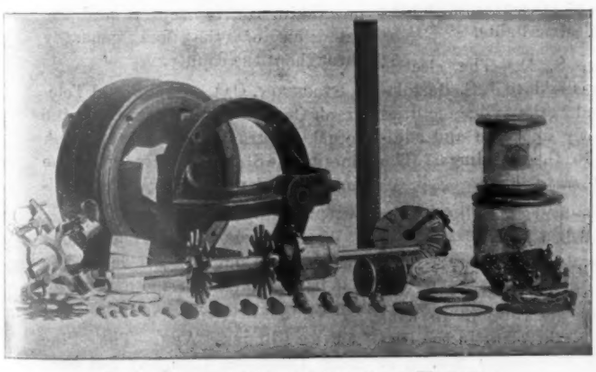

FIG. 2.—STUDENTS' DYNAMO READY FOR WINDING.

FIG. 3.—COMBINED VOLT AND AMPERE METER.

A Trolley Case Decided.

Judge Townsend, in the United States Court at New Haven, Conn., on January 11, refused to reopen the case of the Thomson-Houston Electric Company against the Winchester Avenue Railway Company, in which a decision was given for the plaintiff recently.

An Electric Carriage Company.

A charter has been granted to the Electric Carriage and Wagon Company, of Philadelphia. The incorporators are Victor H. Conkle, Maurice Barnett, G. Herbert Condict, Ralph Gibson and T. Fred Sinnott, all of Philadelphia; capital stock, $10,000.

ADVANCE INFORMATION

Valuable News and Tips for Manufacturers and Dealers.

We publish below information relating to new electric railways, new electric light companies, new telephone companies and projected electric construction of all kinds. Every reader will find these columns of special interest, and manufacturers and supply houses will receive many valuable suggestions looking to new business by carefully watching this department in the ELECTRICAL REVIEW.

New Electric Railways.

BRAINERD, MINN.—Brainerd Traction, Light and Power Company has been incorporated, by C. N. Parker, E. C. Gibson and P. A. Gibson, to construct and operate street railways, electric lights, etc. Capital stock, $300,000.

NARRAGANSETT PIER, R. I.—A new electric line is shortly to be constructed from Watch Hill to Narragansett Pier, by way of Point Judith. William C. Clark, of Wakefield, Conn., is at the head of this enterprise. The road will be 39 miles long.

CHICAGO, ILL.—Electricity will be substituted for horses on the night cars of the Van Buren street, Twelfth street and Grand avenue lines.

EAST MILTON, MASS.—There is a movement to extend the Quincy & Boston Street Railway system from this place to Mattapan.

KEENE, N. H.—The contract for building the electric railroad at this place has been awarded to M. A. Coolidge, formerly of this town.

WEYMOUTH, MASS.—The Weymouth & Braintree Street Railway Company is to erect a power house on Allen street, East Braintree, 45x100 feet, with a chimney 100 feet high.

BARRE, VT.—The Barre Electric Power, Manufacturing and Street Railway Company organized last week. It was voted to change the date for the completion of the road to September, 1896. The company was formally organized with John W. Gordon as president pro tem. and B. H. Wells as clerk. Directors were elected as follows: F. G. Howland, D. M. Miles, of Barre; J. S. Pierson, J. J. Flynn and A. O. Humphrey, of Burlington; H. K. Brush, of Barre; F. C. Kennedy, of Burlington. The directors organized by electing officers as follows: President, J. S. Pierson; vice-president, F. G. Howland; clerk and treasurer, A. O. Humphrey.

DOVER, DEL.—It is expected that work will be commenced on the new electric line between this place and Milford some time in February.

BARRE, VT.—This place is to have an electric street railroad next spring to be built by Burlington parties.

LATROBE, PA.—The Latrobe & Ligonier Electric Street Railway Company has been incorporated, with Edward E. Robbins, of Greensburg, president, to build an electric road from Loyal Hanna Creek through the township of Unity and the boroughs of Youngstown and Ligonier. Capital stock, $72,000.

HANOVER, MASS.—The Hanover & Rockland Electric Railway Company will increase its capital stock from $20,000 to $50,000.

BATH, N. Y.—The Bath & Lake Keuka Railway Company has been incorporated, by Israel A. Kelsey, John T. Prince, C. L. B. Tyler and others, to construct an electric road. Capital stock, $100,000.

GLENVILLE, CONN.—The Port Chester & Glenville Tramway Company has been organized, with David J. Pearsall, president; W. G. Bushnell, treasurer; R. Jay Walsh, secretary, to build an electric railway, at a cost of $75,000.

GRAHAM, VA.—The Graham-Bluefield Electric Railway Company, of which Walter Graham is president, will construct an electric railway, which will be three and one-quarter miles in length.

MEADVILLE, PA.—The Saegertown & Venango Street Railway Company, of which Geo. D. Trawin is president, has been incorporated. Capital stock, $12,000.

ST. CATHARINES, ONT.—The Lincoln Street Railway, Traction and Light Company, Limited, has been incorporated to build an electric railway from St. Catharines to Grimsby.

FREDERICK, MD.—Chas. E. Fleming has been awarded the contract for grading the electric road to Braddock for the Frederick & Middletown Electric Railway Company.

SHELBURNE FALLS, MASS.—Herbert Newell is interested in the construction of an electric railway between Buckland, Shelburne Falls, Shattuckville and Colerain, which recently secured right of way for same.

WATERTOWN, MASS.—The Newtonville & Watertown Street Railway Company has applied for franchise for electric line between Watertown and Brighton.

YOUNGSTOWN, OHIO.—The Park & Falls Street Railway Company will construct its power house in this city.

SPRINGWELLS, MICH.—Chas. A. Parkin and others have been granted franchise to construct an electric railway on the Wyandotte road.

DANVILLE, ILL.—The Danville & Northwestern Electric Railway has secured nearly all the right of way for the construction of its electric railway, which will be 43 miles long.

LEWISTON, N. Y.—The Lewiston & Youngstown Electric Railway Company will construct a $60,000 electric road, for which it recently secured right of way.

Electric Light and Power.

CHARLEVOIX, MICH.—Charlevoix Electric Light Company, Chas. Gabriel, manager, has been granted a franchise to construct a $30,000 electric railway.

CHADWICK, ILL.—Steps are being taken looking to the establishment of an electric light plant.

JERSEY CITY, N. J.—Tilman Electric Lamp Company has been incorporated by John A. Sullivan, Chas. I. Henry, C. Dunler, J. H. Ahern, Richford Walford, J. Rosseler. Capital stock, $200,000.

RIDLEY PARK, PA.—Ridley Park Light, Heat and Power Company has been incorporated by Wm. D. Bennage. Capital stock, $1,000.

HAWKINSVILLE, GA.—The Hawkinsville Electric Light, Heat, Power and Water Company has been incorporated, by W. F. Taylor, W. H. Markmand and others, to construct an electric road.

BLACKSTONE, MASS.—Blackstone Electric Light Company has been incorporated, with Robert B. Taber, president, and Jeremiah Getchell, treasurer. Capital stock, $10,000.

GREENVILLE, S. C.—The Greenville Electric Light Company desires estimates for supplies for a lighting plant of 35 arc and 400 incandescent lights.

ROCKFORD, ILL.—A $60,000 electric light plant is to be constructed by the city next Summer.

GAINESVILLE, FLA.—J. M. Graham and others have petitioned the City Council for a franchise for an electric light plant.

UNIONVILLE, MO.—G. H. Gardner, City Clerk, has opened bids for the erection of an electric light plant to cost not more than $18,000.

SAN BERNARDINO, CAL.—The San Bernardino Electric Company has been awarded the contract for city lighting.

NUTLEY, N. J.—Nichols Electric Light and Power Company has been incorporated by Thomas Nichols, John Nichols, Richard T. Noble. Capital stock, $50,000.

NASHVILLE, MICH.—Residents of this place are at present agitating the question of electric lights.

ABERDEEN, S. D.—The electric light plant was sold to J. S. Bartolomew, of Grand Forks. The facilities will be greatly improved and additions made to the buildings. The consideration was $6,000.

MILO, ME.—An electric light plant is to be established here.

AKRON, OHIO.—The Akron Electric Manufacturing Company has been awarded the contract to construct a 1,000-light plant in the Diamond Match Company's Works, at Liverpool, Eng.

SOMERSWORTH, N. H.—An electric light plant is to be constructed.

HENDERSON, KY.—An electric light plant is to be constructed. The City Clerk may be addressed for information concerning same.

WARRIOR RUN, PA.—Warrior Run Light, Heat and Power Company has been incorporated by George McDonald as treasurer. Capital stock, $20,000.

ASOTIN, WASH.—Lewiston Water and Power Company has been incorporated by O. C. Vanarsdol, E. H. Libby, George Bailey. Capital stock, $100,000.

ASHLEY, PA.—Ashley Light, Heat and Power Company has been incorporated, with George McDonald, of Scranton, as treasurer. Capital stock, $50,000, with $5,000 paid in.

COTTAGE CITY, MASS.—Martha's Vineyard Electric Light and Power Company has been incorporated, with John A. Duggan as president and Josiah Quincy, treasurer. Capital stock, $75,000.

SUGAR NOTCH, PA.—Sugar Notch Light, Heat and Power Company has been incorporated, with George McDonald, of Scranton, as treasurer. Capital stock, $20,000.

ARKADELPHIA, ARK.—The Arkadelphia Power and Light Company's power house was destroyed by fire, at a loss of $60,000; insurance small.

ELIZABETH, N. J.—Mutual Union Investment Company has been incorporated, by Wm. S. Stryker, John W. Rehill, Somerville, N. J., James P. Powers, Elizabeth, to manufacture and supply electricity and power. Capital stock, $100,000.

BALTIMORE, MD.—The Edison Electric Illuminating Company has filed a mortgage for $1,000,000 in favor of the Old Colony Trust Company.

BOULDER, COLO.—The Boulder Electric Light Company has ordered a new dynamo for the purpose of street lighting. It will have a capacity of 50 lamps of 2,000 candle-power each. It is expected to arrive here about February 1.

MACEDON, N. Y.—This village will shortly be lighted by electricity.

New Telephone and Telegraph Companies.

ELKTON, MD.—The Cecil Telephone and Telegraph Company is now taking active steps toward the extension of the line generally throughout the county.

STOCKTON, CAL.—The Postal Telegraph Company will soon begin the actual construction of the telegraph lines to the Stanislaus River along the line of the San Joaquin Valley Railroad.

WILMINGTON, DEL.—The Washington Fire Company has decided to put in a telephone at the expense of the company.

PINE BLUFF, ARK.—The Pine Bluff Telephone Company has been incorporated, with W. H. Parker, president. Capital stock, $25,000.

INDIANAPOLIS, IND.—The Crawford County Telephone Company has been incorporated with a capital stock of $10,000, and the Fort Wayne, Ind., Home Telephone and Telegraph Company has been incorporated with a capital stock of $100,000.

RED WING, MINN.—The North American Telegraph Company will open an office in this city.

Locke's High Insulation Line Material.

In no department of engineering has it been so fully or so frequently demonstrated that good work and good material pay as in the field of the applications of electrical power. Cheap devices, like cheap labor, mean a constantly increasing repair account. The reduction of this often unnecessarily large item of expense means dividends to the operating company.

Mr. Fred M. Locke, of Victor, N. Y., has devoted especial attention to the development of high-grade insulating devices and now has on the market an extensive line of indestructible steel pins, break arms, side brackets, glass and porcelain insulators of high insulation; poles, fittings, cross-arms, braces and line material of all kinds. The steel pin shown in Fig. 1 is made with a steel bolt passing from the top of the pin through a half-inch hole in the cross-arm, and is securely fastened on the under side by a nut and washer. The iron cap between the top of the insulator pin and the cross-arm serves as a brace to resist the strain of the pull on the pin and at the same time covers the pin-hole in the cross-arm, thereby keeping out water and moisture and preserving the arm.

FIG. 1.—LOCKE'S INDESTRUCTIBLE STEEL INSULATOR PIN.

In Fig. 2 is shown a triple petticoat insulator made of the highest grade chinaware obtainable. It measures 5¼ inches in diameter and 4 inches in height, and has over 12 inches of surface between the wire contact and the supporting pin. About .0 inches of this surface is on the under side of the insulator, out of reach of direct rainfall, where it keeps comparatively dry. The surfaces of the bottom of the insulator are perpendicular and therefore catch no foreign matter. By repeated practical tests it has been found that a potential of 85,000 volts is required to puncture the insulator, hence it will carry with safety and economy any voltage that is practicable for use in commercial application of electric power. The body and glaze are of simple earths only, fused together into a vitreous, homogeneous mass at the greatest heat. No lead or other metallic oxide being used in making, the glaze is not a conductor. The body and glaze being of exactly the same material and fired at the same heat, the insulating qualities are as high without as with the glaze. These insulators will not craze or crackle on the surface or "leak," as insulators made of inferior material will do when subjected to variations of temperature. The ware used in their construction will stand severe tensile strains or heavy blows without injury and will not crack or chip from the effects of high potential currents.

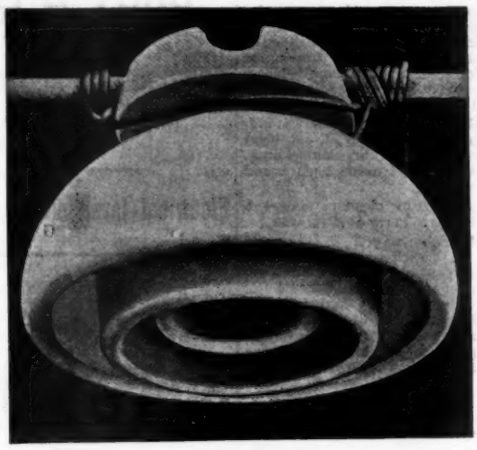

FIG. 2.—LOCKE'S TRIPLE PETTICOAT CHINA INSULATOR.

Specimens of Mr. Locke's patented pole fittings are illustrated in Fig. 3.

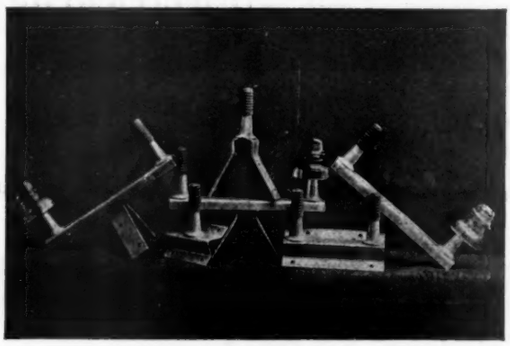

FIG. 3.—LOCKE'S POLE FITTINGS.

PERSONAL.

Mr. Jarvis B. Edson, after a severe illness at his home, in New York city, is able to be out again, and is greeted and congratulated over his recovery by numerous friends.

It is reported that Mr. Edison has brought his magnetic iron ore extractor at Ogden, N. J., to commercial perfection and will again turn his attention to inventions and improvements in the electric lighting field.

Mr. William H. McKinlock, president of the Metropolitan Electric Company, Chicago, U. S. A., is spending a few business days in the East, with headquarters at the Imperial Hotel, New York. The new year has opened up in first-class shape with the Metropolitan company, and its magnificent new and comprehensive catalogue has created a sensation in the electrical field.

Mr. Aladar Rausch, a son of a wealthy manufacturer in Buda Pesth, Hungary, is visiting the United States and will make a report on our engineering and electrical progress to the Hungarian Government. Mr. Rausch will embody the essential features of his report in an address he is to deliver at Buda Pesth next year in honor of the one-hundredth anniversary of the founding of the Hungarian Government.

WE DESIRE TO CORRESPOND with parties who manufacture or handle BICYCLE SPECIALTIES, especially in the electrical line. Address

PACIFIC ELECTRIC COMPANY,
108 Tenth Street,
Tacoma, Wash.

WANTED

Position as electrical engineer, superintendent or manager with an electric street railway company. Several years' experience, and references from former road, from which I resigned for a year's practice in Europe. Street railway preferred, but could manage large electric lighting plant. Address "S. B.",
Care of ELECTRICAL REVIEW,
13 Park Row, N. Y.

MESCO DRY BATTERY.

A standard battery for all open circuit or intermittent work. Highly recommended for Telephone Transmitters.

OVER 230,000 SOLD DURING THE PAST YEAR.

For sale by nearly all the Electrical Supply Houses in the United States.

GIVE IT A SEVERE TEST. Unreliable Dry Batteries are not sold much cheaper than the MESCO.

64-PAGE PAMPHLET FREE. Catalogue, 208 pages, 10 cts.

MANHATTAN ELECTRICAL SUPPLY CO.,
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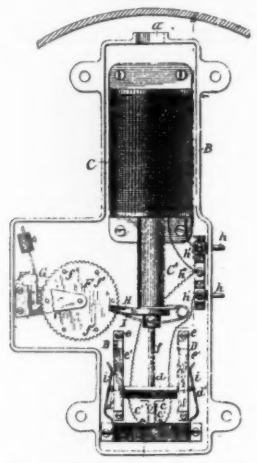
ELECTRICAL PATENTS

ISSUED JANUARY 14, 1896.

552,890 Manufacture of carbide of calcium; W. C. Clarke, New York, N. Y.

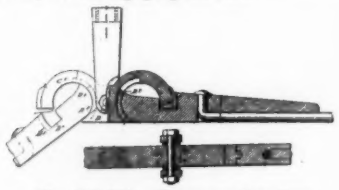
552,924 Electric releasing device; S. H. Reynolds, San José, Cal.—A device for holding a halter, consisting of a chamber having a perforation in its wall, a securing



No. 552,933.—ELECTRIC BELL.

bolt for the ring of the halter and electrical means for releasing said bolt.

552,943 Electric bell; C. B. Sterling, New York, N. Y.—Consists of a gong, a solenoid and a vertically movable core in the solenoid, a circuit maker and breaker connected to the lower end of said core, stationary contacts insulated from each other to engage the circuit maker and breaker, guides for the circuit maker and breaker, electrical connections between the supply conductors and the contacts and a rotary break engaging the core.

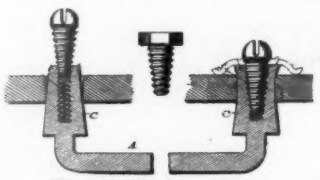


No. 553,061.—TROLLEY CUT-OUT.

552,954 Automatic electric releasing device; J. W. Chute, San José, Cal.—A fulcrumed spring-actuated swinging arm, a spring-actuated latch adapted to engage the arm and retain it in engagement, a spring-actuated bell-crank lever fulcrumed with relation to the latching lever so as strike and disengage it when released, and a catch by which said lever is normally retained out of contact or engagement with the latch.

552,961 Electric motor; D. C. Jackson, Madison, Wis.—Consists of a hub carrying a bearing and provided with a series of holes; a series of removable and interchangeable plugs fitted to said holes.

552,967 Electric arc lamp; L. G. Nilson, Sioux City, Iowa.—A cut-out consisting of



No. 553,099.—RAIL BOND.

a spring-mounted contact point mechanically attached to and adapted to make electrical contact with the head or pole piece of a magnet.

552,972 Telephonic apparatus; C. J. Schwarze, Adrian, Mich.—A combined magneto transmitter and generator, said generator having a revolving pole armature adapted to be normally held in position inductively adjacent with its poles to the poles of the magnet of the generator and to the diaphragm of the transmitter.

552,982 Electric arc lamp; F. J. Borland, Leeds, England.

553,014 Electric circuit connector; T. F. Nevins, Brooklyn, N. Y.

553,035 Driving mechanism for bicycle dynamos; Geo. Mayr, Brooklyn, N. Y.—A bicycle having driving mechanism on one wheel thereof and an electric generator connected therewith.

553,061 Trolley cut-out; Theo. Fletcher, Idlewild, Tex.—A trolley cut-out provided with a hanger comprising side-pieces and a center-piece coupled with the heads of the side-pieces and formed with openings in the bottom, to permit the heads to drop out of the center-pieces, the heads of the side-pieces having segmental ribs at the end to engage in segmental grooves in the center-piece.

553,099 Bonding device for electric railways; W. Brown, Camden, N. J.—A bond terminal having a screw-threaded opening, lengthwise slotted, and means to enter and expand said opening.

553,106 Automatic closing telegraph key; J. A. Coleman, Perry Station, Can.

553,176 Electric railway; T. F. O'Connor, New York, N. Y.—Consists of a suitable way, a motor vehicle, a slotted conduit extending parallel with the way, an electric conductor having one end stationary and connected with a source of power and a conducting arm carried by the motor vehicle and traveling in the slot and to which the electric conductor is connected within the conduit.

553,179 Telephone circuit; E. Slade, Newton, Mass.—A telephone exchange circuit extending between a sub-station and a central station and serving for the transmission of both signals and conversation.

553,181 Sparker for gas and gasoline engines; F. M. Underwood, Upper Sandusky, Ohio.

553,194 Clip for supporting electric cables; R. H. Lewis, Providence, R. I.—A sheet metal blank formed into a circular band and hooks attached to the meeting edges and adapted to take over a suitable projection.

553,198 Automatic lighting or extinguishing apparatus; S. C. Stickle, New York, N. Y.

553,220 Electric lamp support; J. Buckner, Boston, Mass.—Comprises a metal post having a fixed collar near its upper end, a tubular insulator supported by said collar and having an outwardly projecting flange, a sectional metal sleeve clamped upon said insulator and the lamp arms or standards secured to said sleeve.

Electro-Technic Club, of Minneapolis.

The Electro-Technic Club was recently organized at Minneapolis, Minn. Its membership will be restricted to electrical engineers or those engaged in allied work, and its territory will include the whole Northwest. The headquarters of the club are located at room 23 Syndicate Block. The following are the officers and charter members: President, Charles L. Pillsbury; first vice-president, Edward P. Burch; second vice-president, Charles H. Chalmers; secretary, W. E. Stephenson; treasurer, George A. Lintner. The present membership includes the following gentlemen: Prof. George D. Shepardson, Edwin B. Burch, Charles H. Chalmers, George A. Lintner, E. A. Scofield, W. W. Dakin, Frank W. Springer, C. L. Pillsbury, V. I. Gray, W. I. Gray, A. H. Savage, W. E. Stephenson, Frank Reidhead, F. E. Chapman and Harry Lackore.

Standard Electric Company Assigns.

The Standard Electric Company, of Chicago, manufacturers of electrical apparatus, made an assignment on January 16. A. G. Spaulding, the well-known sporting goods man, and Frank Parmalee, the omnibus and carriage owner of Chicago, were stockholders in the company.

The George L. Colgate Company, dealers in electrical supplies, at 136 Liberty street, New York city, made an assignment on January 17 to Percy L. Klock.

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American Institute of Electrical Engineers.

The 102d meeting of the Institute will be held at 12 West Thirty-first street on Wednesday, January 22, at eight o'clock P. M. Mr. Frank J. Sprague will present a paper on "Electric Elevators; Their Uses and Advantages," embodying specific descriptions of various types, which will be shown by lantern slides. The meeting of the western members will be held on Wednesday evening, January 29 (one week later), at the Armour Institute, Thirty-third street and Armour avenue, Chicago.

The council will hold its regular monthly meeting in the rooms of the Institute, 26 Cortlandt street, Wednesday, January 22, four P. M. Members who desire to present papers before any meeting during the season should communicate with the secretary.

Theater Trolley Cars.

The Brooklyn Heights Railway Company have put on two theater parlor cars. A successful trial trip was taken last week. The new cars are supposed to be the finest ever built for use on a street railroad, and they combine almost all the comforts of a parlor buffet coach. They are called theater cars because it is expected they will be in special favor with theater parties; but they are likely to prove equally popular for afternoon luncheons and sightseeing parties.

The two cars now in service are called the "Montauk" and the "Amphion," after two Brooklyn theaters. Each is 25 feet long inside, with five-foot platforms, is mounted on two four-wheeled trucks with hair elliptic and spiral springs to insure ease in riding, and is equipped with Standard air brakes. Both were built by the Barney-Smith Car Company, of Dayton, Ohio. There are outside seats for four persons on each platform. The cars have light electric heaters placed along the walls and are lighted with three chandeliers and an electric light in each buffet. They are also furnished with electric call bells and with small tables for lunches. A colored porter is in charge of each car.

Buffalo Will Get Niagara Power.

The directors of the Niagara Falls Power Company have signed and accepted the franchise for the distribution and sale of electric current in Buffalo, N. Y. The transmission line must be completed by July 1, 1897.

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His connection with the Boardman Manual Training High School at New Haven, Conn., as Instructor in Steam Engineering, his 12 years of active membership in the N. A. S. E. and his position as Instructor of No. 10 of Connecticut, a sturdy branch of the national organization, make him especially competent in this part of the work.

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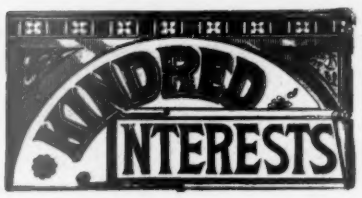

The Penberthy Injector Company, of Detroit, Mich., has sent to the ELECTRICAL REVIEW a very serviceable calendar for 1896. It is a well-executed specimen of good color printing and is a product of the "Penberthy" press, which the company recently established for the printing of its extensive line of advertising circulars.

The Connecticut Telephone and Electric Company, of Meriden, Conn., manufacturers of telephones, telephone equipments and electrical supplies, have received a large number of very strong testimonials referring to their telephone apparatus. This company have received several orders from the New York, New Haven & Hartford Railroad Company, the Delaware & Hudson Canal Company, Cincinnati, New Orleans & Texas Pacific Railway Company, Juneau Telephone Company, of Juneau, Alaska; Perry Telephone Company, of Perry, Ia. The electrician of the New York, New Haven & Hartford Railroad Company made a test of their instruments on a 90-mile circuit with another instrument of well-known make, and pronounced theirs superior in articulation to the other.

The Standard Boiler Company, of Chicago, report a good business during the past year. They have moved into their new offices, 1120 and 1121 Marquette Building. These boilers are built by the well-known firm, Link-Belt Machinery Company, of Chicago, who have put in new and improved machinery for their manufacture, reducing the prime cost as well as making the various parts interchangeable. During the past year a number of fine plants have been installed, among others being: 4,000 horse-power for the North Chicago Street Railroad Company at their new power station at Hawthorne avenue; 500 horse-power for the Cincinnati Edison Company at Cincinnati, Ohio; 600 horse-power for the Western Electric Company at their factory in Chicago and various others. The prospects for the coming year are good.

M. R. Rodrigues, manufacturing electrician, 17 Whipple street, Brooklyn, N. Y., states that his firm is as busy as usual on their "baby" electric motors and also on other special tool and die work of a non-electrical character. They intend to do more of this class of work than heretofore. They find a good sale for their small stamped fibre and metal washers, nuts and turned work, and have secured another shop, where their tool and die work is done. Mr. Rodrigues is ready to estimate on any kind of special tools and to turn out punchings and small brass work of any kind. This firm will also add to the "baby" motor a three and one-quarter inch fan and furnish them either on a small base or with the binding posts on the side. Mr. Rodrigues intended to take a Southern trip this month, thinking that business would slack up, but orders came in so fast he had to stay at home to look after them.

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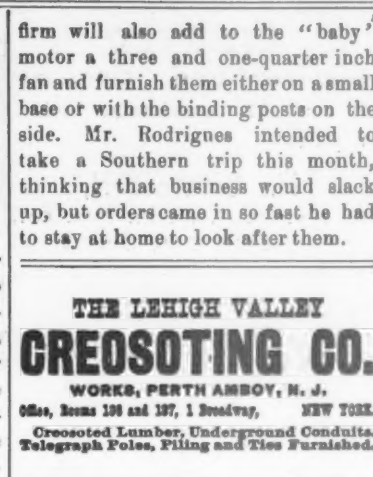

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Said contract to be for the term of five years from and after May 3, 1896.

Said bids to be opened and acted upon at a special meeting of the Council, to be held Friday, February 21, 1896, at 7:30 P. M.

The Council reserves the right to reject any or all bids.

SUMNER T. BISBEE,
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January 25, 1896. Keokuk, Iowa.

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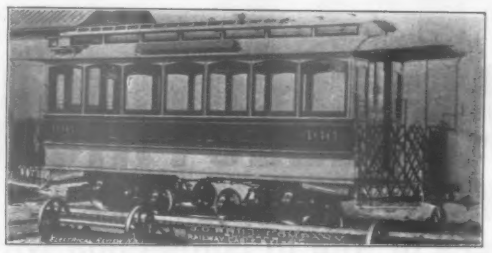

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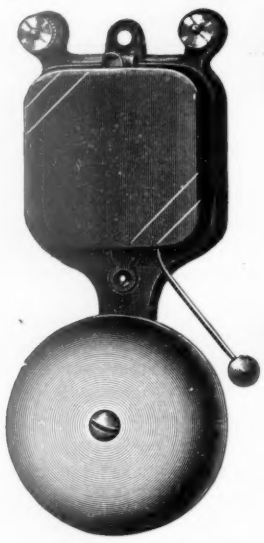

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